PROJECT NUMBER 18-131-SGL (1)
SAN ANGELO STATE SUPPORTED LIVING CENTER
EMERGENCY GENERATOR AND MECHANICAL SYSTEM UPGRADE
11640 US HIGHWAY 87 N
CARLSBAD, TEXAS 76934
SOLICITATION NO.
CONSTRUCTION DOCUMENTS
DECEMBER 16, 2019

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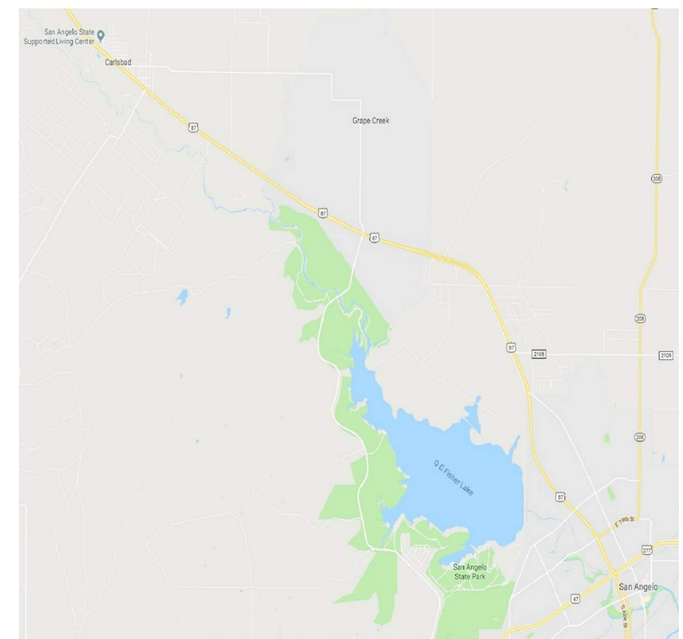
Project Superintendent:

Subcontractors



TEXAS Health and Human Services

TEXAS HEALTH AND HUMAN SERVICES COMMISSION
P.O. BOX 12668 MAIL CODE 2064
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EMC ENGINEERS

EMC ENGINEERS
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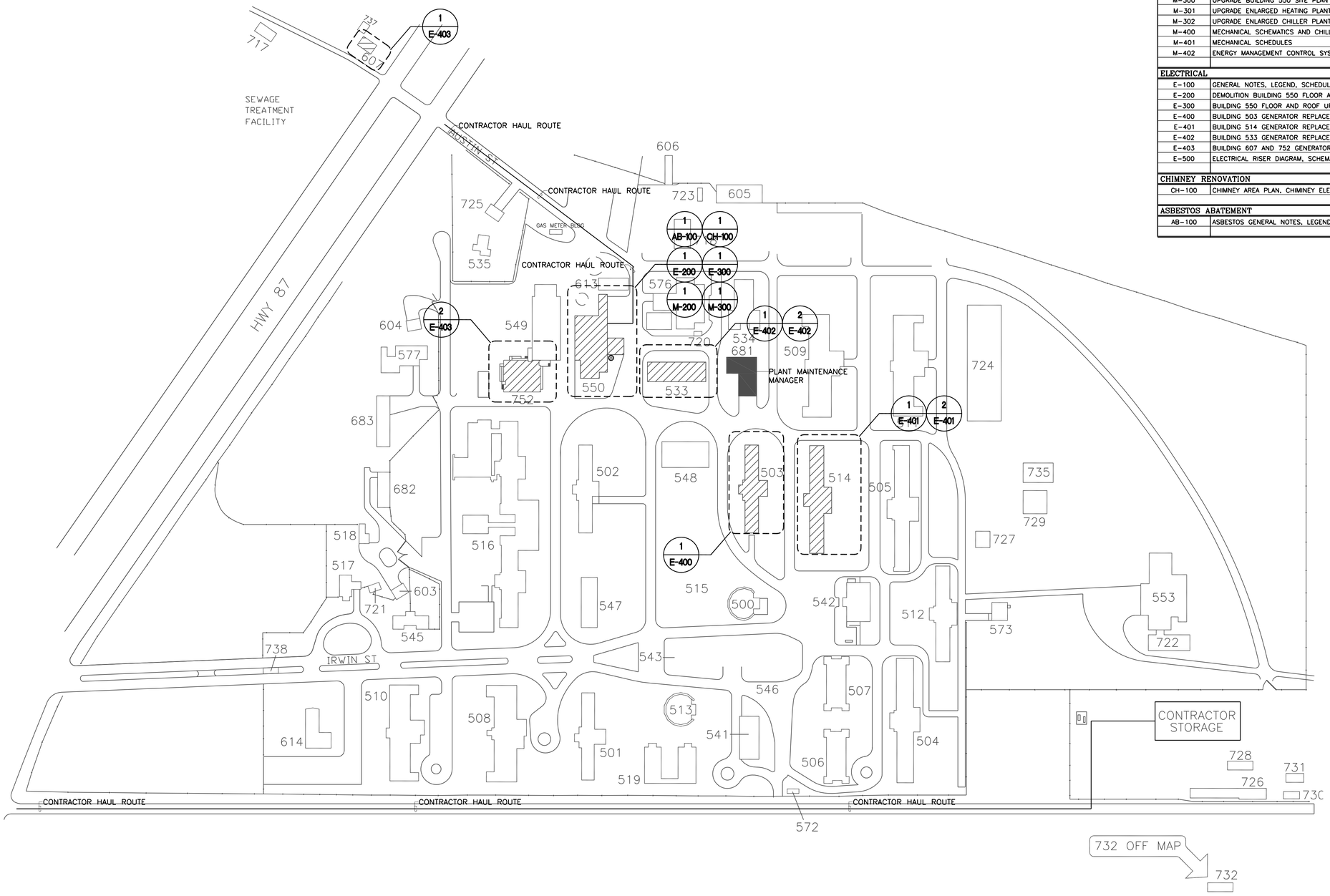
TEXAS FIRM REG. #F2491
EMC PROJECT #1710052

SHEET #	SHEET TITLE
CS	COVER SHEET
ME-100	SITE PLAN, CODE INFORMATION, VICINITY MAP, AERIAL MAP, SHEET INDEX
MECHANICAL	
M-100	GENERAL NOTES, LEGEND, ENERGY CODE
M-200	DEMOLITION BUILDING 550 ROOF AND FLOOR PLAN
M-300	UPGRADE BUILDING 550 SITE PLAN AND COOLING TOWER SECTION
M-301	UPGRADE ENLARGED HEATING PLANT FLOOR PLAN
M-302	UPGRADE ENLARGED CHILLER PLANT FLOOR PLAN
M-400	MECHANICAL SCHEMATICS AND CHILLED/HEATING PLANT SYSTEM FLOW DIAGRAM
M-401	MECHANICAL SCHEDULES
M-402	ENERGY MANAGEMENT CONTROL SYSTEM SEQUENCE OF OPERATIONS AND POINTS LIST
ELECTRICAL	
E-100	GENERAL NOTES, LEGEND, SCHEDULES
E-200	DEMOLITION BUILDING 550 FLOOR AND ROOF PLANS
E-300	BUILDING 550 FLOOR AND ROOF UPGRADE PLANS
E-400	BUILDING 503 GENERATOR REPLACEMENT DEMOLITION AND UPGRADE PLANS
E-401	BUILDING 514 GENERATOR REPLACEMENT DEMOLITION AND UPGRADE PLANS
E-402	BUILDING 533 GENERATOR REPLACEMENT DEMOLITION AND UPGRADE PLANS
E-403	BUILDING 607 AND 752 GENERATOR REPLACEMENT DEMOLITION AND UPGRADE PLANS
E-500	ELECTRICAL RISER DIAGRAM, SCHEMATICS AND LIGHTING SCHEDULE PANELS
CHIMNEY RENOVATION	
CH-100	CHIMNEY AREA PLAN, CHIMINEY ELEVATION, CHIMNEY GENERAL NOTES, LEGEND, SCHEDULES
ASBESTOS ABATEMENT	
AB-100	ASBESTOS GENERAL NOTES, LEGEND, SCHEDULES



LEGEND

- BUILDING WORK AREA
- PLANT MAINTENANCE MANAGER (LOCATION OF EMCS SYSTEM)

NOTE

1. INDIVIDUAL BUILDING STAGING AREAS WILL BE DETERMINED AT PRE-CONSTRUCTION CONFERENCE.

N PLAN

1 ME-100 **BUILDING LOCATION SITE PLAN**

SCALE: 1" = 100'-0"

100 50 0 100 200

STATE OF TEXAS — ROBERT J. BLANCHETTE — 120820 — REGISTERED PROFESSIONAL ENGINEER

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CONSTRUCTION DOCUMENTS AUGUST 13, 2018

Rev.#	Date	Initials	Revision Description:

Designed By: EMC
Drawn By: EMC
Checked By: EMC
Scale: AS SHOWN

EMC ENGINEERS
2211 E. MISSOURI AVE. SUITE 312
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TEXAS FIRM REG. #F2491
EMC PROJECT #1710052

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)
Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN

Sheet
ME-100
SITE PLAN, CODE INFORMATION, VICINITY MAP SHEET INDEX
1 of: 1

MECHANICAL GENERAL NOTES:

GENERAL

1. THESE MECHANICAL/PLUMBING GENERAL NOTES ARE APPLICABLE TO ALL MECHANICAL SHEETS IN THIS PROJECT SET.

2. THE MECHANICAL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE APPLICABLE AND ADOPTED PROVISIONS OF THE FOLLOWING CODES:
   2012 INTERNATIONAL BUILDING CODE
   2012 INTERNATIONAL PLUMBING CODE
   2012 INTERNATIONAL MECHANICAL CODE
   2012 INTERNATIONAL FIRE CODE
   2012 INTERNATIONAL FUEL CODE
   2015 INTERNATIONAL ENERGY CONSERVATION CODE
   AS ADOPTED AND INTERPRETED BY THE STATE OF TEXAS, TEXAS HEALTH AND HUMAN SERVICES COMMISSION STANDARDS AND GUIDELINES, AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) REGULATIONS, CURRENT ADOPTED EDITION REGARDING MECHANICAL SYSTEMS, FIRE PROTECTION AND ALARM SYSTEMS AND ASSOCIATED PLUMBING AND ELECTRICAL SYSTEMS. ALL LABOR AND MATERIALS NECESSARY TO COMPLY WITH RULES, REGULATIONS AND ORDINANCES SHALL BE PROVIDED. WHERE THE DRAWINGS INDICATE MATERIALS OR CONSTRUCTION IN EXCESS OF CODE REQUIREMENTS, THE DRAWINGS SHALL GOVERN. THE CONTRACTOR SHALL HOLD AND SAVE THE OWNER AND ENGINEER FREE AND HARMLESS FROM LIABILITY OF ANY NATURE OR KIND ARISING FROM HIS FAILURE TO COMPLY WITH ALL APPLICABLE CODES AND ORDINANCES.

3. THE CONTRACTOR SHALL COORDINATE WITH OWNER AND ENGINEER ANY WORK THAT HAS THE POTENTIAL TO HINDER MECHANICAL AND PLUMBING SERVICES TO AREA OUTSIDE OF THIS CONTRACT. ALL SHUT- DOWNS OR TIE-INS RELATING TO THESE SYSTEMS SHALL BE SCHEDULED AND SUBMITTED IN WRITING AND TO BE APPROVED BY THE OWNER AND THIS ENGINEER OFFICE. CONTRACTOR SHALL SUBMIT IN WRITING A SCHEDULE FOR PHASING OF CONSTRUCTION THAT INDICATES AREAS OF FIRST PRIORITY DURING EACH PHASE AND ANTICIPATED COMPLETION TIMES. SCHEDULES SHALL BE SUBMITTED A MINIMUM OF ONE WEEK PRIOR TO COMMENCING WORK. OWNER AND ENGINEER SHALL REVIEW THESE SCHEDULES AND NOTIFY CONTRACTOR OF ACCEPTANCE PRIOR TO COMMENCEMENT OF WORK. WHERE NEW WORK IS APPLICABLE TO PATIENT/CLIENT LIVING, USE, OR SUPPORT AREAS; CONTRACTOR SHALL OBTAIN AN APPROVED INFECTION CONTROL PERMIT PRIOR TO INITIATING ACTUAL WORK. PERMIT APPLICATION SHALL BE INITIATED WITH HIS MOBILIZATION SUBMITTAL. (SEE UGCS/SGCS ARTICLE 7.8.)

4. ALL MATERIALS AND LABOR NECESSARY TO COMPLY WITH CODES AND RULES, REGULATIONS AND ORDINANCES SHALL BE PROVIDED. WHERE THE DRAWINGS AND/OR SPECIFICATIONS INDICATE MATERIALS OR CONSTRUCTION IN EXCESS OF CODE REQUIREMENTS, THE DRAWINGS AND/OR SPECIFICATIONS SHALL GOVERN. THE CONTRACTOR SHALL HOLD AND SAVE THE OWNER AND ENGINEERS FREE AND HARMLESS FROM LIABILITY OF ANY NATURE OR KIND ARISING FORM HIS FAILURE TO COMPLY WITH ALL APPLICABLE CODES AND ORDINANCES.

5. BIDDERS SHALL VISIT THE SITE AND SHALL BE RESPONSIBLE FOR HAVING ASCERTAINED PERTINENT LOCAL CONDITIONS SUCH AS LOCATION, ACCESSIBILITY AND GENERAL CHARACTER OF THE SITE, THE CHARACTER AND EXTENT OF THE WORK WITHIN THE BUILDING AND TO BECOME FAMILIAR WITH ALL OTHER WORK TO BE PERFORMED AT THIS TIME. NO ADDITIONAL COMPENSATION WILL BE ALLOWED DUE TO CONTRACTOR'S FAILURE TO DETERMINE ALL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. PROSPECTIVE BIDDERS ARE HIGHLY ENCOURAGED TO ATTEND THE SCHEDULED PRE-BID SITE VISIT TO THOROUGHLY FAMILIARIZE THEMSELVES WITH ANY AND ALL EXISTING SITE AND PROJECT LOCATION CONDITIONS WHICH MAY AFFECT THE WORK UNDER THIS CONTRACT. THE OWNER AND ENGINEER WILL NOT BE RESPONSIBLE FOR CONTRACTOR ERRORS OR OMISSIONS WHICH COULD BE MADE REASONABLY KNOWN BY ATTENDING A SCHEDULED SITE VISIT.

6. EACH CONTRACTOR SHALL GIVE ALL REQUISITE NOTICES AND FILLED OUT APPLICATIONS, OBTAIN AND PAY FOR ALL PERMITS, DEPOSITS AND FEES (INCLUDING UTILITY CONNECTIONS FEES, ANY UTILITY EXTENSION FEES, TAP FEES, DEVELOPMENT FEES, AND IMPACT FEES) NECESSARY FOR THE INSTALLATION OF WORK UNDER THESE NOTES. TWO (2) COPIES OF CERTIFICATES OF APPROVAL SHALL BE OBTAINED FROM ALL AUTHORITIES ISSUING SAME AND SHALL BE TURNED OVER TO OWNER AND ENGINEER PRIOR TO FINAL ACCEPTANCE OF THE WORK.

7. REQUIRED INSURANCE SHALL BE PROVIDED BY THIS CONTRACTOR FOR PROTECTION AGAINST PUBLIC LIABILITY AND PROPERTY DAMAGE FOR THE DURATION OF WORK. CONTRACTOR SHALL SECURE AND PAY ALL PERMITS, FEES, INSPECTIONS, AND TESTS UNLESS OTHERWISE INDICATED. COORDINATE WITH ENGINEER, OWNER. SUBSTITUTIONS REQUESTED BY THE CONTRACTOR SHALL BE PAID FOR BY THE CONTRACTOR.

8. ALL WORK SHALL CONFORM WITH FEDERAL, STATE, AND LOCAL CODES, RULES, AND REGULATIONS. ALL WORK SHALL BE PERFORMED BY A LICENSED CONTRACTOR IN A FIRST CLASS WORKMANLIKE MANNER. THE SYSTEMS SHALL BE INSTALLED COMPLETE AND FULLY OPERATIVE UNLESS OTHERWISE INDICATED

9. ALL WORK IS NEW UNLESS OTHERWISE INDICATED TO BE "EXISTING" OR "REUSED" OR "RELOCATED". CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND PROVIDE A WRITTEN REPORT TO THE ENGINEERING OFFICE. THIS REPORT SHALL DESCRIBE EXISTING DAMAGE OR OTHER CONDITIONS THAT MAY INTERFERE WITH THIS PROPOSED NEW WORK. THIS SITE SURVEY SHALL ALSO INCLUDE VERIFICATION OF SIZES, LOCATIONS, AND CONDITIONS OF EXISTING UTILITIES. QUESTIONS REGARDING THESE DRAWINGS SHALL BE ADDRESSED TO THE ENGINEER PRIOR TO THE AWARDING OF THE CONTRACT. OTHERWISE THE ENGINEER'S INTERPRETATION OF THE MEANING AND INTENT OF THE DRAWINGS SHALL BE FINAL. THE PLANS INDICATE THE EXTENT AND GENERAL REQUIREMENTS OF THE DEMOLITION, ALTERATIONS, RELOCATIONS, AND ADDITIONS. IF ANY DEPARTURES FROM THE DRAWINGS ARE DEEMED NECESSARY BY THE CONTRACTOR, DETAILS OF SUCH DEPARTURES AND THE REASONS THEREFORE SHALL BE SUBMITTED AS SOON AS POSSIBLE TO THE ENGINEER AND OWNER FOR ACTION. NO SUCH DEPARTURES SHALL BE MADE WITHOUT PRIOR APPROVAL OF THE ENGINEER AND OWNER.

10. EXISTING UNDERGROUND UTILITY LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS PRIOR TO EXCAVATION OR TRENCHING.

11. ALL SYSTEMS AND COMPONENTS SHALL BE APPROVED FOR THE PURPOSE FOR WHICH THEY ARE INSTALLED. ALL EQUIPMENT AND MATERIALS SHALL BE NEW AND FROM ESTABLISHED AMERICAN SUPPLIERS UNLESS OTHERWISE INDICATED.

12. ALL EQUIPMENT PARAMETERS SHOWN ARE FOR PERFORMANCE AT SITE ALTITUDE. SUPPLIERS SHALL SELECT AND DEMONSTRATE THAT THEIR EQUIPMENT MEETS THE DESIGN CONDITIONS AT SITE ALTITUDE.

13. MECHANICAL CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR THE ELECTRICAL REQUIREMENTS, INCLUDING POWER, CONTROL, COMMUNICATION, AND MONITORING, OF EACH DEVICE PROVIDED AND/OR INSTALLED BY MECHANICAL CONTRACTOR.

14. SUPPORT SYSTEM FOR PIPING MATERIALS AND EQUIPMENT SUPPORTED BY THE BUILDING STRUCTURE SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO PURCHASE AND INSTALLATION. NO WIRE OR PERFORATED STRAP WILL BE PERMITTED FOR ANY HANGER OR SUPPORT.

15. CONTRACTOR SHALL NOT CUT, DRILL, OR ALTER ANY ELEMENT OF ANY WALLS, FLOORS CEILINGS, ROOFS, AND SLABS WITHOUT FIRST RECEIVING INSTRUCTIONS FROM ENGINEER. ALL CUTS SHALL BE MADE WITH A CUTTING TOOL.

16. PATCHING OR SEALING OF CUTS OR PENETRATIONS SHALL BE DONE BY CONTRACTOR PER MANUFACTURE'S RECOMMENDATION AND INSTRUCTIONS AND TO FINAL APPROVAL OF ENGINEER.

17. CONTRACTOR SHALL FIELD VERIFY CONDITION OF EXISTING EQUIPMENT AND PROVIDE NECESSARY COMPONENTS TO ASSEMBLE AND TO START-UP COMPLETE AND FULLY OPERATIONAL SYSTEMS. WHEREVER THE WORD(S) "PROVIDE", "FURNISH", "INSTALL" AND/OR THE LIKE IS/ARE USED; IT IS TO BE DEFINED AS AND UNDERSTOOD TO REQUIRE THAT THE CONTRACTOR SHALL PROVIDE THE ITEM/SYSTEM(S) TOTALLY AND COMPLETELY FURNISHED, INSTALLED, AND FULLY OPERABLE AND USEABLE FOR ITS/THEIR INTENDED PURPOSE(S) UNLESS SPECIFICALLY NOTED OTHERWISE IN THE CONTRACT DOCUMENTS.

18. BEFORE INSTALLATION, EQUIPMENT AND DEVICES INCLUDING, BUT NOT LIMITED TO, ANY DEVICE WITH ELECTRICAL CONNECTIONS, DUCTWORK, INSULATION, PIPING, VALVES, AND AIR DEVICES SHALL NOT BE STORED DIRECTLY ON GRADE OR ON A SLAB OR FLOOR. BEFORE AND AFTER INSTALLATION, SUCH EQUIPMENT AND DEVICES SHALL BE PROTECTED FROM ENTRY OF DIRT, TRASH WATER (EXCEPT AS REQUIRED), VERMIN.

19. CONTRACTOR SHALL COORDINATE ACTUAL LOCATIONS OF PIPING AND VALVES WITH LIGHTS AND JOIST SPACING CONTRACTOR SHALL FIELD VERIFY BY MEASUREMENT EXACT LOCATIONS DEPICTED AND ALL DIMENSIONS.

20. PROVIDE THE OWNER WITH COPIES OF OPERATION AND MAINTENANCE (O&M'S) MANUALS AS REQUIRED BY THE SPECIFICATIONS. THE O&M'S SHALL INCLUDE ALL INSTALLATIONS INSTRUCTIONS FOR PRODUCT DATA, WARRANTIES, CONTACT INFORMATION DURING WARRANTY PERIOD, COPIES OF ALL PERMIT INFORMATION, AND AIR AND HYDRONIC TESTING AND BALANCING REPORTS IN 3-RING BINDERS AND CD VERSION. ALL LABOR AND MATERIALS PROVIDED FROM CONTRACTOR SHALL HAVE COMPLETE ONE (1) YEAR WARRANTY. ALL BOILERS, COOLING TOWERS, PUMPS, AND MOTORS SHALL BE WARRANTIED FOR FIVE (5) YEARS, INCLUDING LABOR AND MATERIALS.

21. OPERATING TESTS AND CLEANING PROCEDURES SHALL BE PERFORMED AND REPORTS SHALL BE ISSUED PER CODE REQUIREMENTS, MANUFACTURER'S RECOMMENDATIONS.

22. CONTRACTOR SHALL PROVIDE AND INSTALL IDENTIFICATION TAGS FOR EQUIPMENT AND PIPING PER OWNER'S STANDARDS, SPECIFICATIONS, AND ASME 13.1 SCHEME OF IDENTIFICATION FOR PIPING.

23. LOCATIONS OF MECHANICAL EQUIPMENT ARE APPROXIMATE AS SHOWN. MECHANICAL CONTRACTOR SHALL FIELD ADJUST AS REQUIRED.

24. CONTRACTOR SHALL TAKE PRECAUTIONS TO PROTECT EXISTING TREES AND /OR OTHER SITE VEGETATION.

25. FOR OUTDOOR EQUIPMENT ON GRADE AND INDOOR FLOOR MOUNTED EQUIPMENT, THE CONTRACTOR SHALL CONSTRUCT LEVEL 3000 PSI CONCRETE(28 DAY COMPRESSIVE STRENGTH) SLABS WITH FINISHED EDGES, WIRE REINFORCED MINIMUM 6X6 W1.4/1.4 OR HEAVIER PER ASTM A185, MINIMUM 6" THICK, AND MINIMUM 6" LARGER ON ALL SIDES THAN THE EQUIPMENT BEING SUPPORTED. THE PAD SHALL HAVE 2 COATS OF EPOXY SEALANT TO SEAL THE PAD.

26. ALL PIPING, PLUMBING AND DUCTWORK OPENINGS SHALL BE CAPPED DURING DEMOLITION AND CONSTRUCTION.

27. EXISTING MECHANICAL EQUIPMENT, COMPONENTS, AND PIPING BEING REUSED SHALL BE INSPECTED, CLEANED, AND PRESSURE TESTED PER THE TESTING REQUIREMENTS STATED BELOW. CONTRACTOR SHALL FIELD VERIFY EXISTING MECHANICAL EQUIPMENT, COMPONENTS, AND PIPING CONDITIONS REPORT TO EVERY EFFORT HAS BEEN MADE TO CLEARLY AND FULLY DEPICT ALL KNOWN EXISTING CONDITIONS AND ITEMS REQUIRING REMOVAL, RELOCATION, DEMOLITION AND/OR ALTERATION. DUE TO THE SMALL SCALE OF THE DRAWINGS AND THE NATURE OF RENOVATION AND REHAB WORK CERTAIN ITEMS SUCH AS THOSE CONCEALED BEHIND EQUIPMENT, FINISHES, OR STRUCTURAL MEMBERS AND THE LIKE; OR THOSE NOT ACCESSIBLE FOR INSPECTION OR IDENTIFIABLE AS ABANDONED OR TO BE ABANDONED WITHOUT DESTRUCTION; MAY NOT BE SPECIFICALLY AND/OR SEPARATELY DEFINED OR SHOWN. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED REMOVAL, RELOCATION, DEMOLITION, AND/OR ALTERATION OF SUCH ITEMS REASONABLY INHERENT WITH SUCH RENOVATION AND REHABILITATION WORK AT NO ADDITIONAL COST TO THE OWNER IN ACCORDANCE WITH THE BEST COMMERCIAL PRACTICES AND THESE CONTRACT DOCUMENTS TO PROVIDE A COMPLETE AND USEABLE FACILITY WITHIN THE SCOPE OF THE WORK TO BE PERFORMED. NO CONSIDERATION SHALL BE GIVEN TO THE NATURE OF THE MATERIALS, AND ALL DEMOLITION SHALL BE DESIGNATED AS UNCLASSIFIED DEMOLITION. DEMOLITION OF EVERY DESCRIPTION AND OF WHATEVER SUBSTANCES ENCOUNTERED SHALL BE PERFORMED TO THE DEGREE REQUIRED FOR THE INSTALLATION OF THE ITEMS/FINISHES REQUIRED HEREIN OR AS SPECIFIED.

28. SITE VISIT REPORTS
    DURING THE COURSE OF THE JOB, THE ENGINEER WILL MAKE SITE VISITS TO OBSERVE WORK IN PROGRESS AND WILL SUBSEQUENTLY PREPARE A WRITTEN SITE VISIT REPORT, WHICH WILL BE SENT TO THE CONTRACTOR AND TO WHOMEVER ELSE THE ENGINEER DESIRES. THE CONTRACTOR SHALL PREPARE A WRITTEN AND TYPED RESPONSE IN THE NEXT WEEKLY LOG REPORT AND SHALL INCLUDE:
    A. DATE OF SITE VISIT BY THE ENGINEER,
    B. DATE OF RECEIPT OF THE SITE VISIT REPORT,
    C. NAME AND TITLE OF THE PREPARER OF THE RESPONSE,
    D. AN ITEM NUMBER REFERENCED TO THE SITE REPORT,
    E. A BRIEF THREE OR FOUR WORD DESCRIPTION OF THE ITEM,
    F. THE CONTRACTOR OR SUBCONTRACTOR AFFECTED,
    G. THE PROPOSED COURSE OF ACTION, AND
    H. AN EXPECTED TIME OF COMPLETION OF THE ACTION.

29. SUBSTITUTED PRODUCTS
    A. MATERIAL OR EQUIPMENT SPECIFIED BY MANUFACTURER'S NAME IS BEING USED AS A BASIS OF STANDARD. NO SUBSTITUTION IS ALLOWABLE WITHOUT ENGINEER'S WRITTEN APPROVAL FOURTEEN (14) DAYS PRIOR TO BID DUE DATE UNLESS THE MANUFACTURER IS LISTED ON THE DRAWINGS AND/OR IN THE SPECIFICATION AS BEING A PREAPPROVED ALTERNATIVE MANUFACTURER. ANY SUBMITTAL RECEIVED WITHOUT SUCH WRITTEN APPROVAL OR PRIOR APPROVAL IS SUBJECT TO UNQUALIFIED REJECTION.
    B. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THAT SUBMITTED SUBSTITUTE EQUIPMENT WILL FIT IN SPACE AVAILABLE. THE CONTRACTOR'S SUBMITTAL FOR ACCEPTANCE OF THE SUBSTITUTE SHALL INCLUDE A WRITTEN STATEMENT OF WHETHER OR NOT SUCH ACCEPTANCE WOULD REQUIRE ANY SUBSEQUENT OR ASSOCIATED CHANGES TO THE DRAWINGS OR SPECIFICATIONS. ANY SUCH CHANGES SHALL BE DESCRIBED IN WRITING, BRIEFLY BUT COMPLETE.
    C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COSTS OF ANY SUCH MODIFICATIONS DUE TO SUBSTITUTION OF MATERIALS OR EQUIPMENT FOR THAT WHICH WAS SPECIFIED OR SCHEDULED. THE COST SHALL BE COMPLETE, THAT IS, IT SHALL INCLUDE THE COST EFFECT OF ANY AND ALL OTHER TRADES.
    D. THE ENGINEER MAY REQUEST DETAILED SHOP DRAWING OR PLAN LAYOUTS OF MECHANICAL ROOMS OR SYSTEMS OF THE SUBSTITUTED EQUIPMENT.
    E. SHOULD A SUBSTITUTION BE APPROVED BY THE ENGINEER (BASED UPON THE SUBSTITUTION SUBMITTAL REVIEW) AND ACCEPTED, AND SHOULD THE SUBSTITUTE MATERIAL OR EQUIPMENT PROVE DEFECTIVE, NOT MEETING DESIGN PARAMETERS, OR OTHERWISE UNSATISFACTORY FOR THE SERVICE INTENDED WITHIN THE GUARANTEE PERIOD, THIS MATERIAL OR EQUIPMENT SHALL BE REPLACED WITH THE MATERIAL OR EQUIPMENT SPECIFIED AT NO ADDITIONAL COST TO THE OWNER.

HVAC

30. BALANCING (NEEB CERTIFIED) CONTRACTOR SHALL BALANCE THE HVAC SYSTEMS USING AABC OR NEBB STANDARDS. PROVIDE 3 COPIES OF BALANCING REPORT USING STANDARD NEBB FORMS PER SPECIFICATIONS. THE BALANCING CONTRACTOR SHALL WORK FOR THE OWNER ONLY NOT FOR THE MECHANICAL CONTRACTOR.

31. DEVICES THAT MIGHT CAUSE OR OPERATE WITH VIBRATION OR NOISE SHALL BE ISOLATED PER MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.

32. HYDRONIC PIPING MATERIAL SHALL BE IN ACCORDANCE WITH MINIMUM HYDRONIC PIPE MATERIAL REQUIREMENTS. SCHEDULE HANGERS AND SUPPORTS SHALL BE IN ACCORDANCE WITH MSS-SP58, MSS-SP69, AND MSS-SP89 STANDARDS. PROVIDE 3/4" MANUAL AIR VENT WITH ISOLATION VALVE AT THE TOP OF EVERY HYDRONIC HIGH POINT IN THE SYSTEM. HYDRONIC PIPING SHALL BE INSULATED WITH 1" THICK @ 0.24 BTUH/INCH/SQ FT/DEG F FIBERGLASS PER INSULATION SCHEDULE. PIPING EXPOSED TO THE EXTERIOR SHALL BE JACKETED WITH ALUMINUM JACKET: ASTM B209, THICKNESS: 0.016 INCH SHEET, FINISH: SMOOTH, JOINING: LONGITUDINAL SLIP JOINTS AND 2 INCH LAPS, FITTINGS: 0.016 INCH THICK DIE SHAPED FITTING COVERS WITH FACTORY ATTACHED PROTECTIVE LINER, METAL JACKET BANDS: 3/8 INCH WIDE; 0.015 INCH THICK ALUMINUM.

33. TESTS:
    A. TESTS SHALL BE COMPLETE AND APPROVED PRIOR TO FINAL INSPECTION AND PRIOR TO COVERING WITH INSULATION OR EARTH.
    B. ALL PRESSURE TESTS SHALL BE CHARTED USING A STRIPE CHART RECORDER WITH ENOUGH PAPER FOR THE DURATION OF THE TEST SHOWN. REFER TO OTHER SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. THE TEST RESULTS SHALL INCLUDE TEST RUN, TEST DATE, PERSON DOING THE TESTING, AND ENGINEER OR AUTHORITY HAVING JURISDICTION SIGNATURE.
    C. ALL TESTS SHALL BE WITNESSED AND APPROVED BY THE ENGINEER AND THE LOCAL AUTHORITY HAVING JURISDICTION BEFORE COVERING OR INSULATING. PROVIDE ENGINEER WITH A MINIMUM OF 72 HOUR WRITTEN NOTICE PRIOR TO ANY TESTING.
    D. HYDRAULICALLY TEST ALL HEATING WATER, CONDENSING WATER, CHILLED WATER, AND DRAIN PIPING BEFORE CONNECTING TO THE UNITS AT 150 PSIG HYDROSTATIC PRESSURE. TEST TO BE HELD FOR A MINIMUM OF SIX (6) HOURS.
    E. THE SATISFACTORY OPERATION OF BLOWERS, PUMPS AND OTHER EQUIPMENT WITH MOVING PARTS SHALL BE DEMONSTRATED TO THE ENGINEER. EQUIPMENT WITHOUT MOVABLE PARTS SHALL HAVE PRESSURE OR OTHER TESTS PERFORMED BY THE CONTRACTOR TO DEMONSTRATE SATISFACTORY OPERATION
    F. FURNISH ALL INSTRUMENTS, PUMPS, BLOWERS AND EQUIPMENT REQUIRED FOR THE TESTING.
    G. PROVIDE WRITTEN APPROVED COPIES OF THESE TEST REPORTS FOR INCLUSION ON THE OPERATIONS AND MAINTENANCE MANUALS AND SUBMIT ONE COPY TO THE MECHANICAL ENGINEER.

MECHANICAL SYMBOL LEGEND

SYMBOL	DESCRIPTION
	NEW EQUIPMENT
#	NEW WORK KEYED NOTE
XXX #	NEW EQUIPMENT ABBREVIATION SEQUENCE NUMBER
©	CONTROL SWITCH
A	MATCH LINE "A"
U.N.O.	UNLESS NOTED OTHERWISE
CHS	H-NW-ChilWSup (CHS)
CHR	H-NW-ChilWRet (CHR)
HWS	H-NW-HeatWSup (HWS)
HWR	H-NW-HeatWRet (HWR)
TWS	H-NW-CoolTwrS (TWS)
TWR	H-NW-CoolTwrR (TWR)
	AUTOMATED BUTTERFLY VALVE
	BUTTERFLY VALVE
P-X	BASE MOUNTED PUMP
	SWING CHECK VALVE
	Y STRAINER
CT-X	COOLING TOWER
B-X	HEATING WATER BOILER
CH-X	CENTRIFUGAL CHILLER CH-X
CH-X	SCROLL CHILLER CH-X
	THREE WAY CONTROL VALVE

NOTES: GENERAL LEGEND NOT ALL ITEMS APPLICABLE TO THIS PROJECT

FOR INFORMATION ONLY

COMcheck Software Version 4.0.8.1

Mechanical Compliance Certificate

Project Information

Energy Code:	2012 IECC
Project Title:	San Angelo SSLC Central Plant and Generator Upgrades
Location:	San Angelo, Texas
Climate Zone:	3b
Project Type:	Alteration

Construction Site:
10950 US HIGHWAY 87 N
CARLSBAD, TX 76934

Owner/Agent:
HHSC Maintenance and Construction
Texas Health and Human Services Commission
909 W. 45th Street, Bldg. 633
Austin, TX 78751
512-2065204

Designer/Contractor:
EMC Engineers
2211 E Missouri Ave
W107
El Paso, TX 79903
915-781-2030

Mechanical Systems List

Quantity	System Type & Description
3	Plant 1-GAS-BOILER: Heating: Hot Water Boiler, Capacity 3500 kBtu/h, Gas Proposed Efficiency: 96.00 % Ec, Required Efficiency: 82.00 % Ec
1	Plant 1-PROPANE-BOILER: Heating: Hot Water Boiler, Capacity 3500 kBtu/h, Gas Proposed Efficiency: 96.00 % Ec, Required Efficiency: 82.00 % Ec

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2012 IECC requirements in COM*check* Version 4.0.8.1 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

MELVIN G. GLASS	Melvin G Glass	12/17/2019
Name - Title	Signature	Date

STATE OF TEXAS
MELVIN GARY GLASS
64955
LICENSED
PROFESSIONAL ENGINEER

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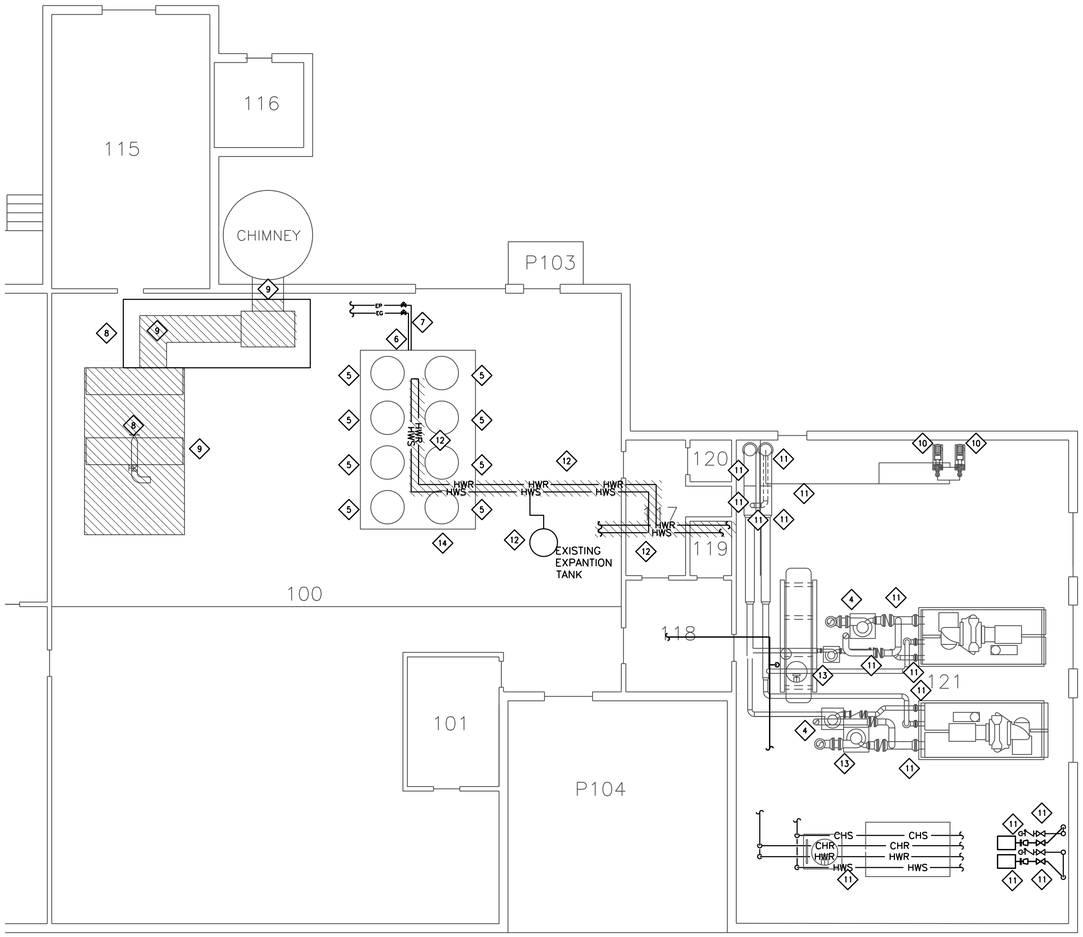
EL PASO, TEXAS, 79903
PH: 915-781-2030
FAX: 915-781-2040
TEXAS FIRM REG. #F2491
EMC PROJECT #1710052

Rev. #	Date	Issuds	Revison Description:

Designed By: EMC
Drawn By: EMC
Checked By: EMC
Scale: AS SHOWN

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)
Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN
Sheet M-100
MECHANICALGENERAL NOTES, LEGEND AND ENERGY CODE
1 of: 8

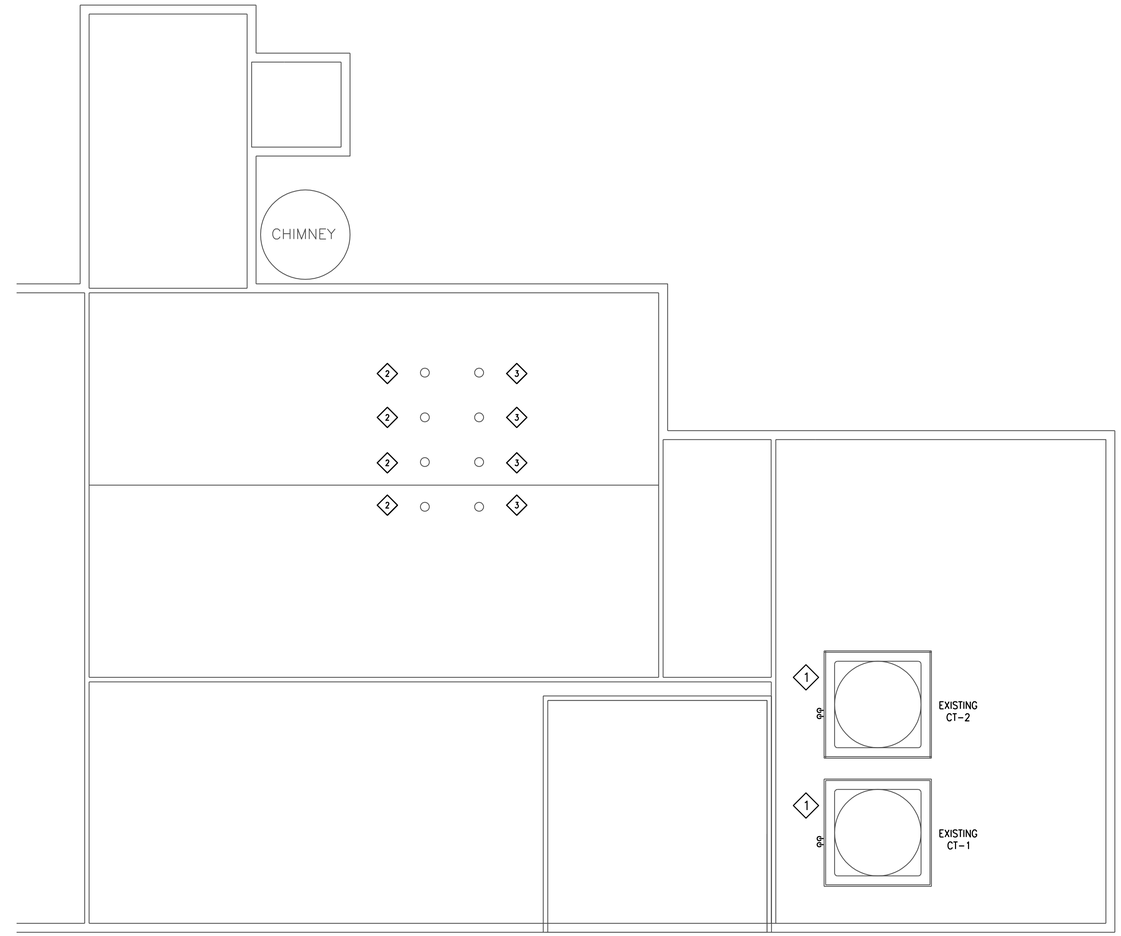


MECHANICAL - BUILDING 550 DEMOLITION FLOOR PLAN

1 / M-200 — PLAN

SCALE: 1/8" = 1'-0"

8 6 4 2 0 4 8 12 16



MECHANICAL - BUILDING 550 EMOLITION ROOF PLAN

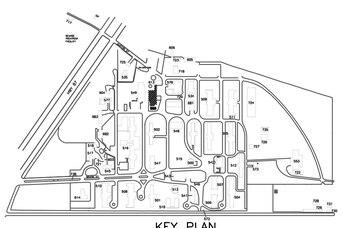
2 / M-200 — PLAN

SCALE: 1/8" = 1'-0"

8 6 4 2 0 4 8 12 16

MECHANICAL DEMOLITION KEYED NOTES:

1. EXISTING COOLING TOWER TO BE REMOVED FROM ROOF. EXISTING CONDENSER SUPPLY AND RETURN WATER PIPING TO BE REMOVED TO BELOW ROOF. EXISTING CONDENSER PIPING OPENINGS TO BE CAPPED ABOVE ROOF AND MADE WEATHER TIGHT. EXISTING COOLING TOWER MAKEUP WATER PIPING TO BE REMOVED TO BELOW ROOF. EXISTING MAKEUP WATER PIPE OPENING TO BE CAPPED ABOVE ROOF AND MADE WEATHER TIGHT. EXISTING COOLING TOWER SUPPORT STRUCTURE TO BE REMOVED BACK TO ROOF PENETRATION. FLANGE CONNECTION TO REMAIN IN PLACE ON ROOF. EXISTING COOLING TOWER TEMPERATURE CONTROLLER AND ASSOCIATED DEVICES ARE TO BE REMOVED BACK TO MAIN PANEL IN CHILLER ROOM. REFER TO ELECTRICAL PLANS FOR UPGRADE OF ELECTRICAL POWER FOR HVAC EQUIPMENT.
2. EXISTING FLUE IS TO BE REMOVED AND FLUE OPENING ABOVE ROOF TO BE CAPPED AND MADE WEATHER TIGHT.
3. EXISTING FLUE IS TO BE REMOVED AND EXISTING FLUE OPENING TO BE REUSED FOR THE NEW BOILER FLUE. FLASH IN NEW FLUE TO EXISTING ROOF OPENING AS REQUIRED.
4. EXISTING CHILLER CONDENSER WATER PUMP AND ASSOCIATED ISOLATION VALVES TO BE REMOVED AND REPLACED WITH A PIPE SPOOL PIECE PER SCHEMATIC 4/M-400, SIZED TO FIT THE OPENING. REFER TO UPGRADE PLANS (M-302) FOR FURTHER INFORMATION. REFER TO ELECTRICAL PLANS FOR UPGRADE OF ELECTRICAL POWER.
5. EXISTING HEATING WATER BOILER WITH ASSOCIATED FLUE STACK, AND HEATING WATER PIPING WITH VALVES TO THE PIPING MAIN, ARE TO BE REMOVED IN THEIR ENTIRETY.
6. EXISTING HEATING WATER BOILER NATURAL GAS PIPING AND VALVE TO BE REMOVED BACK TO REGULATOR. CAP NATURAL GAS PIPING AT REGULATOR FOR REUSE.
7. EXISTING HEATING WATER BOILER PROPANE GAS PIPING AND VALVING TO BE REMOVED BACK TO REGULATOR. CAP PROPANE GAS PIPING AT REGULATOR FOR REUSE.
8. EXISTING ABANDONED STEAM BOILER IS TO BE REMOVED IN ITS ENTIRETY INCLUDING ANY PIPING AND VALVES ASSOCIATED WITH THE BOILER AFTER ASBESTOS ABATEMENT IS COMPLETED. EXISTING GAS CONNECTION TO BE REMOVED BACK TO THE MAIN AND THE MAIN IS TO BE CAPPED FOR THIS BOILER THE EXISTING GAS PIPING TO THE EXISTING HOT WATER BOILERS IS TO REMAIN IN PLACE AND OPERATIONAL. ALL STEAM BOILER DEMOLITION WORK TO BE DONE AFTER ASBESTOS ABATEMENT REMEDIATION HAS BEEN COMPLETED, REFER TO ASBESTOS REMEDIATION DRAWINGS AB-100 AND SPECIFICATIONS FOR FURTHER INFORMATION.
9. EXISTING STEAM BOILER FLUE ASSEMBLY TO BE REMOVED FROM THE STEAM BOILER TO THE ENTRY TO THE CHIMNEY. CAP THE CHIMNEY ENTRY AND MAKE WEATHER TIGHT
10. EXISTING CAMPUS PUMPS (P-1 AND P-2) AND ASSOCIATED VALVING TO BE REMOVED AND BE REPLACED WITH NEW PUMPS. COORDINATE PUMP REPLACEMENT SO ONLY ONE PUMP IS REPLACED AT A TIME SO THE CAMPUS HEATING/COOLING SYSTEM STAYS IN OPERATION.
11. EXISTING GATE OR BUTTERFLY VALVE TO BE REPLACED WITH NEW BUTTERFLY VALVE AND FLANGED SPOOL PIECE PER SCHEMATIC 4/M-400. REFER TO UPGRADE DRAWINGS (M-302 AND M-400) FOR FURTHER INFORMATION.
12. EXISTING HEATING WATER PIPING TO BE REMOVED BACK TO THE CONNECTION TO THE PRIMARY MAINS IN CHILLER ROOM AT THE ISOLATION VALVES RETAIN THE EXISTING PIPING CONNECTIONS AND EXTEND NEW PIPING AS INDICATED. EXISTING EXPANSION TANK TO REMAIN AND BE REUSED. EXISTING CHEMICAL FEED SYSTEM TO REMAIN AND RECONNECT TO THE PIPING AT THE SAME CONNECTION LOCATIONS AS THE PRESENT CONNECTION WITH NEW CONNECTION OPENINGS.
13. EXISTING CHILLER CHILLED WATER PUMP AND ASSOCIATED ISOLATION VALVES AND PIPING TO BE REMOVED AND REPLACED WITH A NEW BASE MOUNTED PUMP, REFER TO UPGRADE PLANS (M-302) FOR FURTHER INFORMATION. REFER TO ELECTRICAL PLANS FOR REMOVAL OF ELECTRICAL POWER.
14. REMOVE THREE (3) FEET OF EXISTING HEATING PLANT HOUSEKEEPING PAD TO ALLOW FOR FORKLIFT TO ENTER BUILDING FROM NORTH GARAGE DOOR. REFURBISH CONCRETE AS REQUIRED FOR A FINISH LOOK. MAINTAIN A MINIMUM NINE (9) FEET FROM THE NEAREST PAD CORNER TO THE NORTHEAST END OF THE DOOR AS INDICATED.



KEY PLAN

STATE OF TEXAS — MELVIN GARY GLASS — 64955 — LICENSED PROFESSIONAL ENGINEER — 12-03-2019

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TEXAS FIRM REG. #F2491
EMC PROJECT #1710052

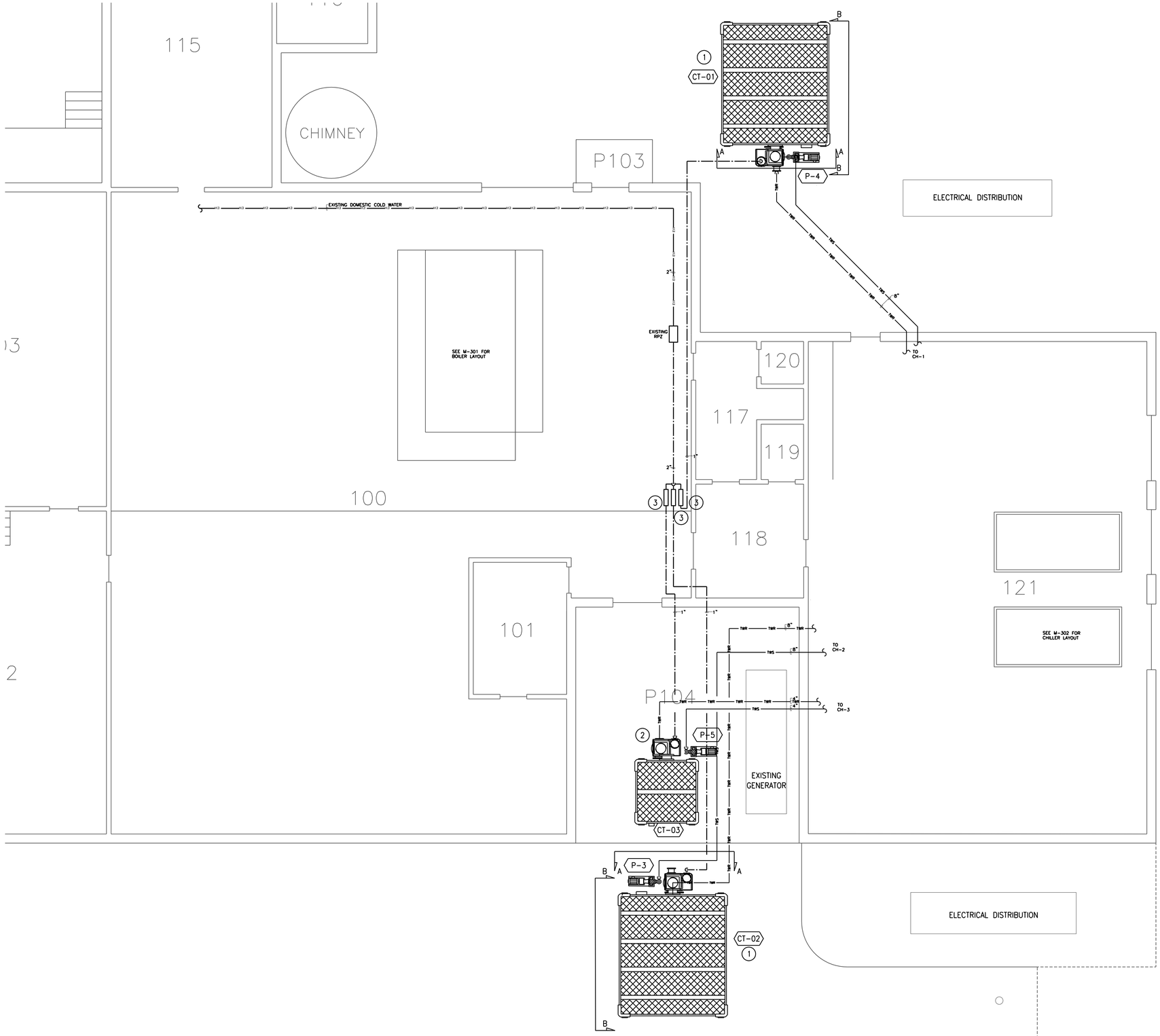
Designed By: EMC
Drawn By: EMC
Checked By: EMC
Scale: AS SHOWN

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)

Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN

Sheet M-200
DEMOLITION
BUILDING 550 FLOOR AND ROOF PLANS

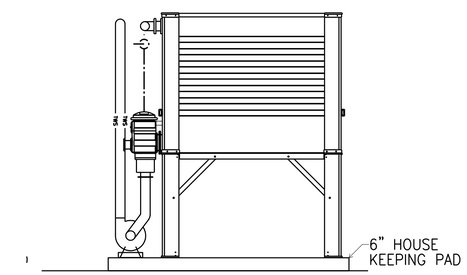


MECHANICAL REMODEL KEYED NOTES: (#)

1. NEW COOLING TOWER MOUNTED ON GRADE ON NEW 6" HOUSEKEEPING PAD. CONNECT TO NEW PIPING AS SHOWN. SEE REMODEL FLOOR PLAN FOR PIPE CONTINUATION.
2. REMOVE EXISTING SHEET METAL OVERHANG AS REQUIRED FOR COOLING TOWER INSTALLATION.
3. NEW 1" COOLING TOWER MAKEUP WATER ASSEMBLY PER SCHEMATIC 3/M-400. CONNECT COOLING TOWER MAKEUP WATER CONNECTION TO NEAREST DOMESTIC WATER MAIN.

PHASING GENERAL NOTE

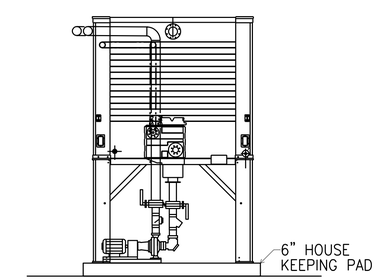
1 WORK SHALL BE DONE IN PHASES. WORK ON THE CHILLER PLANT SHALL BE DONE DURING HEATING SEASON. WORK ON THE HEATING PLANT SHALL BE DONE DURING THE COOLING SEASON. ASBESTOS AND CHIMNEY WORK CAN BE DONE DURING EITHER SEASON.



COOLING TOWER (CT-01 AND CT-02) SECTION B-B

3 / M-300

SCALE: 3/16" = 1'-0" (CT-03 SIMILAR)



COOLING TOWER (CT-01 AND CT-02) SECTION A-A

2 / M-300

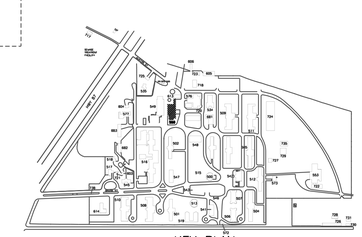
SCALE: 3/16" = 1'-0" (CT-03 SIMILAR)

MECHANICAL - BUILDING 550 SITE UPGRADE PLAN

1 / M-300

SCALE: 3/16" = 1'-0"

PLAN



KEY PLAN

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PH: 915-781-2030
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TEXAS FIRM REG. #F2491
EMC PROJECT #1710052

Designed By: EMC
Drawn By: EMC
Checked By: EMC
Scale: AS SHOWN

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)

Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

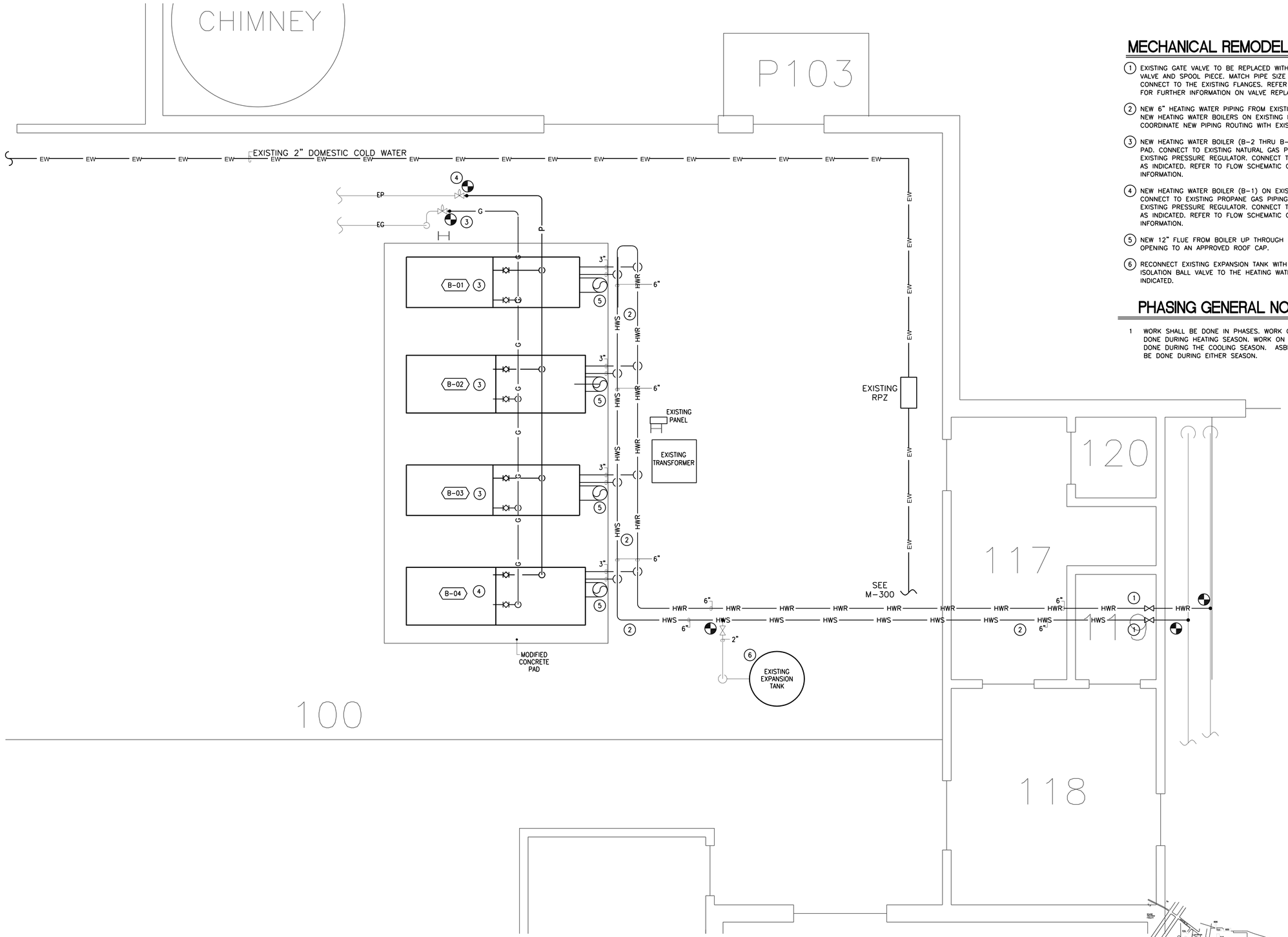
Job Number: 1710052

Date: 04/30/18

Scale: AS SHOWN

Sheet M-300
BUILDING 550 FLOOR UPGRADE PLANS

3 of: 8



MECHANICAL REMODEL KEYED NOTES:

1. EXISTING GATE VALVE TO BE REPLACED WITH NEW MANUAL BUTTERFLY VALVE AND SPOOL PIECE. MATCH PIPE SIZE AND LENGTH AS REQUIRED. CONNECT TO THE EXISTING FLANGES. REFER TO FLOW SCHEMATIC ON M-400 FOR FURTHER INFORMATION ON VALVE REPLACEMENT
2. NEW 6" HEATING WATER PIPING FROM EXISTING MAIN CAMPUS PIPING TO NEW HEATING WATER BOILERS ON EXISTING HOUSEKEEPING PAD. COORDINATE NEW PIPING ROUTING WITH EXISTING PIPING AS REQUIRED.
3. NEW HEATING WATER BOILER (B-2 THRU B-4) ON EXISTING HOUSEKEEPING PAD. CONNECT TO EXISTING NATURAL GAS PIPING AS INDICATED FROM THE EXISTING PRESSURE REGULATOR. CONNECT TO NEW HEATING WATER MAINS AS INDICATED. REFER TO FLOW SCHEMATIC ON M-400 FOR FURTHER INFORMATION.
4. NEW HEATING WATER BOILER (B-1) ON EXISTING HOUSEKEEPING PAD. CONNECT TO EXISTING PROPANE GAS PIPING AS INDICATED FROM THE EXISTING PRESSURE REGULATOR. CONNECT TO NEW HEATING WATER MAINS AS INDICATED. REFER TO FLOW SCHEMATIC ON M-400 FOR FURTHER INFORMATION.
5. NEW 12" FLUE FROM BOILER UP THROUGH ROOF THROUGH EXISTING ROOF OPENING TO AN APPROVED ROOF CAP.
6. RECONNECT EXISTING EXPANSION TANK WITH NEW NEW 2" PIPING AND ISOLATION BALL VALVE TO THE HEATING WATER SUPPLY PIPING AS INDICATED.

PHASING GENERAL NOTE

1 WORK SHALL BE DONE IN PHASES. WORK ON THE CHILLER PLANT SHALL BE DONE DURING HEATING SEASON. WORK ON THE HEATING PLANT SHALL BE DONE DURING THE COOLING SEASON. ASBESTOS AND CHIMNEY WORK CAN BE DONE DURING EITHER SEASON.

MECHANICAL - BUILDING 550 UPGRADE HEATING PLANT FLOOR PLAN

PLAN 1 / M-301

SCALE: 3/8" = 1'-0"

4 3 2 1 0 4

KEY PLAN

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STATE OF TEXAS
MELVIN GARY GLASS
64955
12/18/18
REGISTERED PROFESSIONAL ENGINEER

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PH: 915-781-2030
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EMC PROJECT #1710052

Designed By: EMC
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Checked By: EMC
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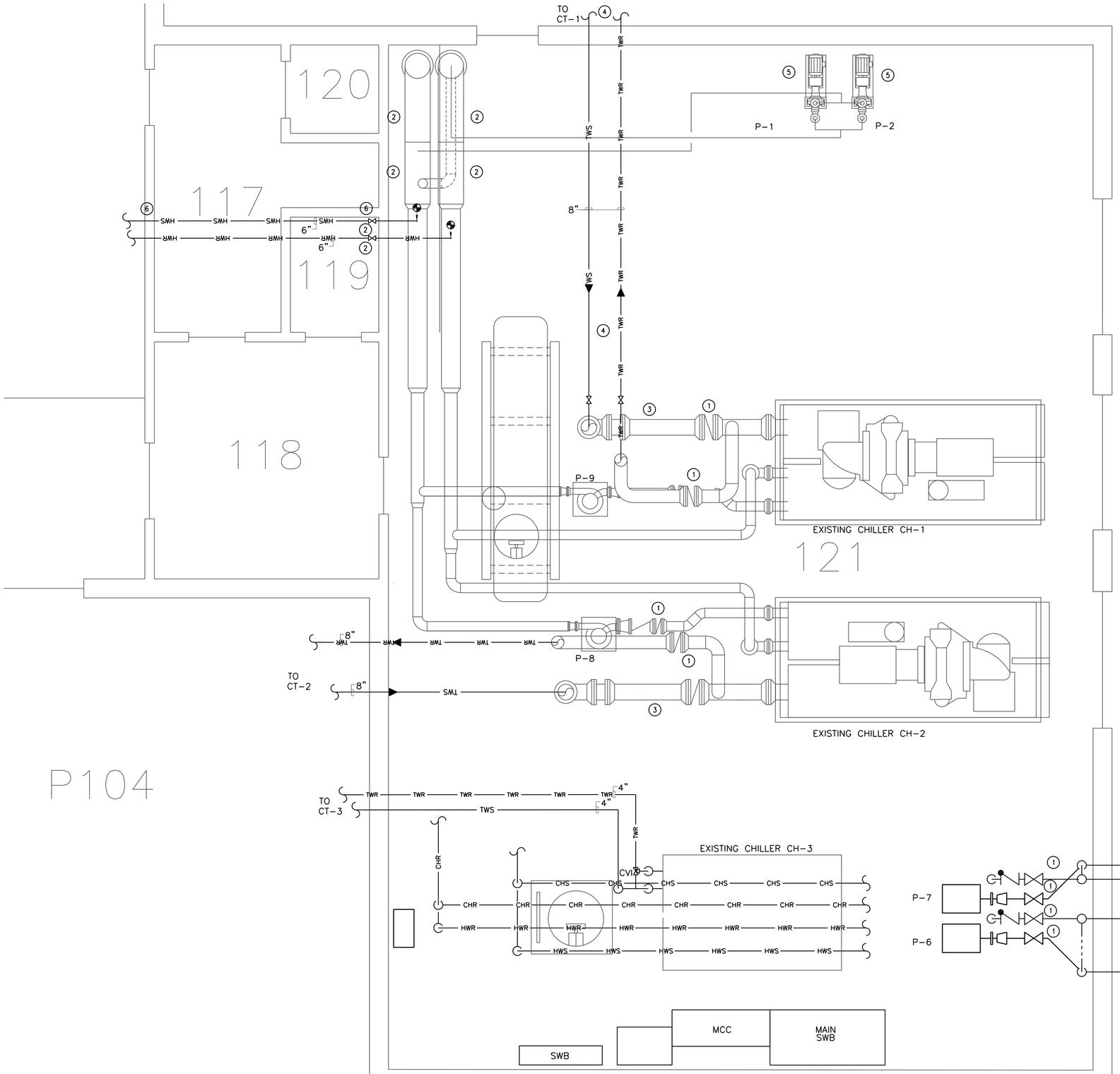
Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)
Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN
Sheet M-301
UPGRADE BUILDING 550 HEATING PLANT FLOOR PLAN
4 of: 8



MECHANICAL REMODEL KEYED NOTES:

1. EXISTING GATE VALVE TO BE REPLACED WITH NEW MANUAL BUTTERFLY VALVE AND SPOOL PIECE. MATCH PIPE SIZE AND LENGTH AS REQUIRED. CONNECT TO THE EXISTING FLANGES. REFER TO FLOW SCHEMATIC ON M-400 FOR FURTHER INFORMATION ON VALVE REPLACEMENT
2. EXISTING GATE VALVE TO BE REPLACED WITH NEW MOTORIZED BUTTERFLY VALVE AND SPOOL PIECE. MATCH PIPE SIZE AND LENGTH AS REQUIRED. CONNECT TO THE EXISTING FLANGES. REFER TO FLOW SCHEMATIC ON M-400 FOR FURTHER INFORMATION ON VALVE REPLACEMENT
3. INSTALL NEW PIPE SPOOL PIECE WITH FLANGES TO CONNECT THE PIPING WHERE EXISTING PUMP WAS REMOVED. LENGTH AS REQUIRED.
4. NEW 8" CONDENSER WATER PIPING FROM EXISTING CHILLER TO NEW COOLING TOWER AND PUMP. COORDINATE NEW PIPING ROUTING WITH EXISTING PIPING AS REQUIRED.
5. EXISTING CAMPUS PUMPS (P-1 AND P-2) AND ASSOCIATED VALVING TO BE REMOVED AND REPLACED WITH NEW PUMPS. REPLACE ONLY ONE PUMP AT A TIME SO THE CAMPUS HEATING/COOLING SYSTEM STAYS IN OPERATION.
6. NEW 6" HEATING WATER PIPING. REFER TO M-301 FOR FURTHER INFORMATION.

PHASING GENERAL NOTE

1 WORK SHALL BE DONE IN PHASES. WORK ON THE CHILLER PLANT SHALL BE DONE DURING HEATING SEASON. WORK ON THE HEATING PLANT SHALL BE DONE DURING THE COOLING SEASON. ASBESTOS AND CHIMNEY WORK CAN BE DONE DURING EITHER SEASON.

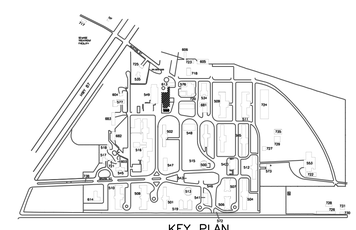
N PLAN

1 / M-302

MECHANICAL - BUILDING 550 UPGRADE CHILLER PLANT FLOOR PLAN

SCALE: 3/8" = 1'-0"

4 3 2 1 0 4



KEY PLAN

STATE OF TEXAS
MELVIN GARY GLASS
64955
LICENSED
PROFESSIONAL ENGINEER
04/30/18

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PROJECT NO : 18-131-SGL (1)

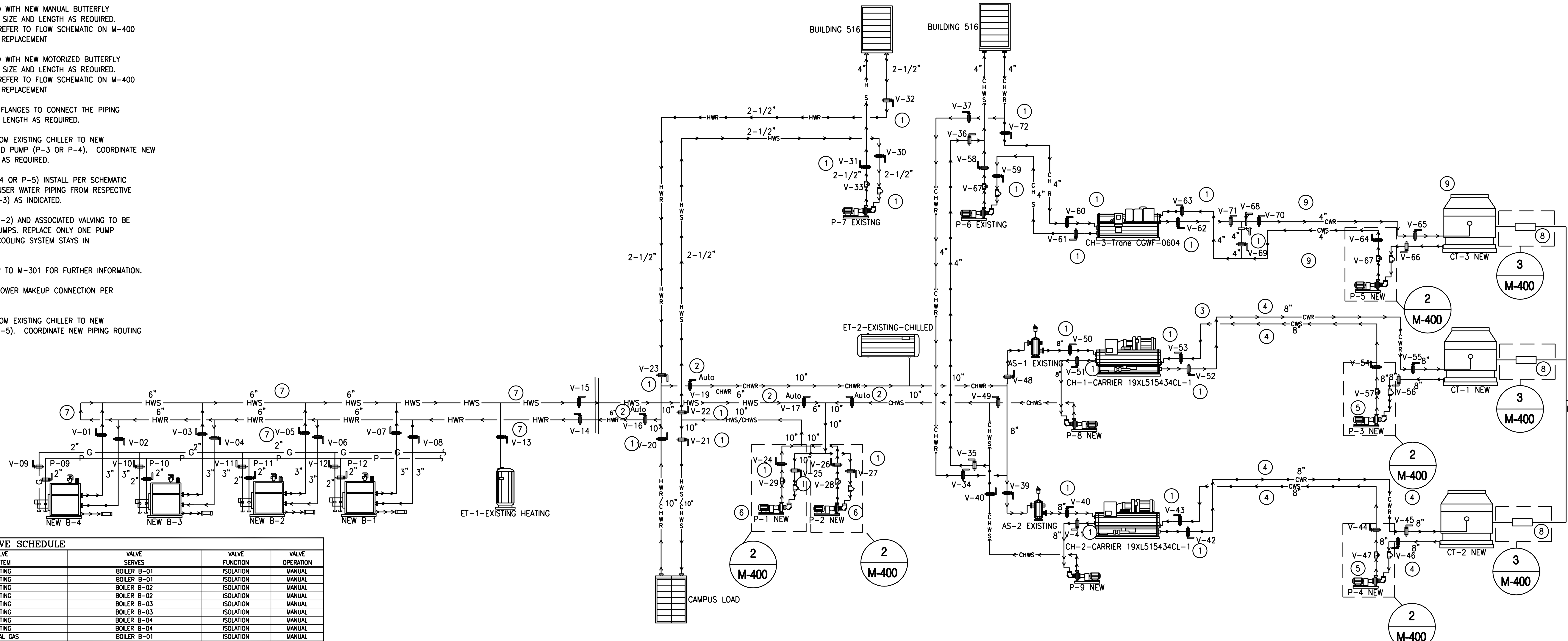
Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN

Sheet M-302
UPGRADE BUILDING 550 CHILLER PLANT FLOOR PLAN
5 of: 8

MECHANICAL KEYED NOTES:

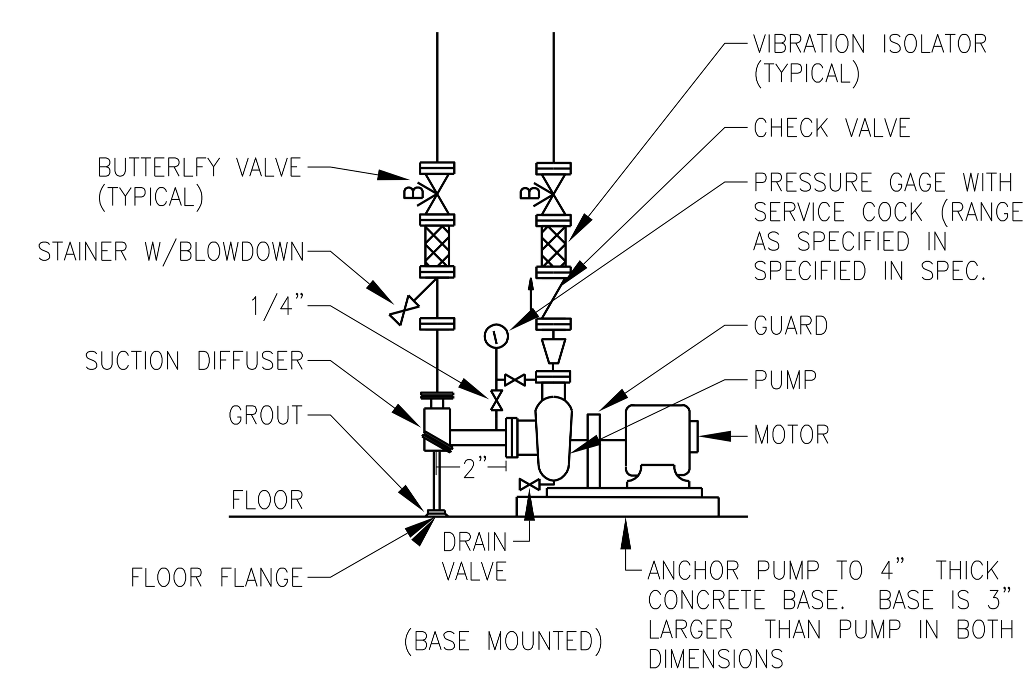
1. EXISTING GATE VALVE TO BE REPLACED WITH NEW MANUAL BUTTERFLY VALVE AND SPOOL PIECE. MATCH PIPE SIZE AND LENGTH AS REQUIRED. CONNECT TO THE EXISTING FLANGES. REFER TO FLOW SCHEMATIC ON M-400 FOR FURTHER INFORMATION ON VALVE REPLACEMENT
2. EXISTING GATE VALVE TO BE REPLACED WITH NEW MOTORIZED BUTTERFLY VALVE AND SPOOL PIECE. MATCH PIPE SIZE AND LENGTH AS REQUIRED. CONNECT TO THE EXISTING FLANGES. REFER TO FLOW SCHEMATIC ON M-400 FOR FURTHER INFORMATION ON VALVE REPLACEMENT
3. INSTALL NEW PIPE SPOOL PIECE WITH FLANGES TO CONNECT THE PIPING WHERE EXISTING PUMP WAS REMOVED. LENGTH AS REQUIRED.
4. NEW 8" CONDENSER WATER PIPING FROM EXISTING CHILLER TO NEW COOLING TOWER (CT-1 OR CT-02) AND PUMP (P-3 OR P-4). COORDINATE NEW PIPING ROUTING WITH EXISTING PIPING AS REQUIRED.
5. NEW COOLING TOWER PUMP (P-3, P-4 OR P-5) INSTALL PER SCHEMATIC 2/M-400. CONNECT PUMP TO CONDENSER WATER PIPING FROM RESPECTIVE COOLING TOWER (CT-1, CT-2, OR CT-3) AS INDICATED.
6. EXISTING CAMPUS PUMPS (P-1 AND P-2) AND ASSOCIATED VALVING TO BE REMOVED AND REPLACED WITH NEW PUMPS. REPLACE ONLY ONE PUMP AT A TIME SO THE CAMPUS HEATING/COOLING SYSTEM STAYS IN OPERATION.
7. NEW 6" HEATING WATER PIPING. REFER TO M-301 FOR FURTHER INFORMATION.
8. NEW 1" MAKEUP WATER TO COOLING TOWER MAKEUP CONNECTION PER SCHEMATIC 3/M-400.
9. NEW 4" CONDENSER WATER PIPING FROM EXISTING CHILLER TO NEW COOLING TOWER (CT-3) AND PUMP (P-5). COORDINATE NEW PIPING ROUTING WITH EXISTING PIPING AS REQUIRED.



1/M-400 CENTRAL PLANT COOLING/HEATING FLOW SCHEMATIC

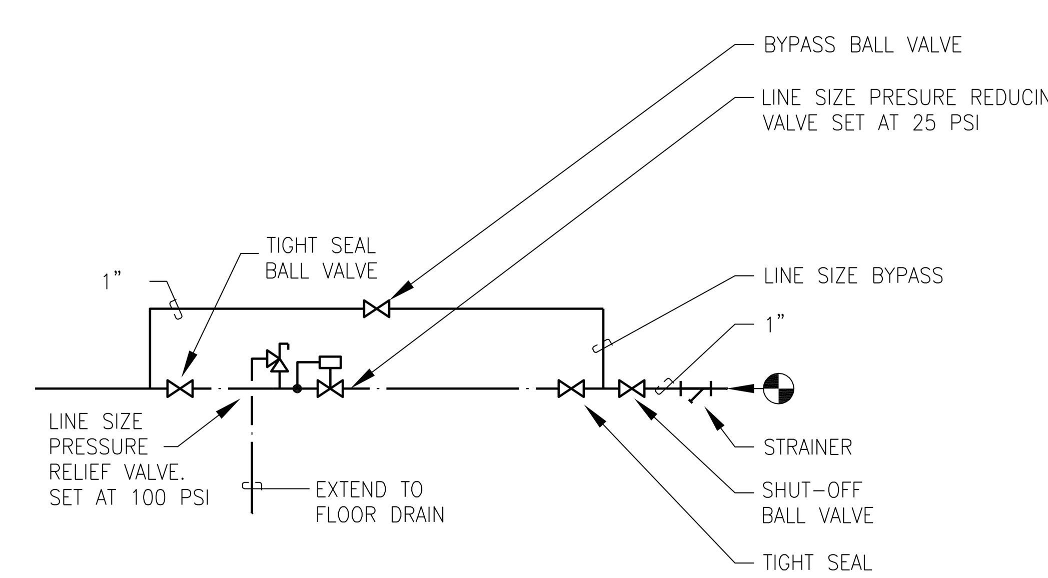
SCALE: NONE

VALVE SCHEDULE							
NUM	VALVE NUMBER	VALVE TYPE	VALVE SIZE	VALVE SYSTEM	VALVE SERVES	VALVE FUNCTION	VALVE OPERATION
1	V-01	BUTTERFLY	3"	HEATING	BOILER B-01	ISOLATION	MANUAL
2	V-02	BUTTERFLY	3"	HEATING	BOILER B-01	ISOLATION	MANUAL
3	V-03	BUTTERFLY	3"	HEATING	BOILER B-02	ISOLATION	MANUAL
4	V-04	BUTTERFLY	3"	HEATING	BOILER B-02	ISOLATION	MANUAL
5	V-05	BUTTERFLY	3"	HEATING	BOILER B-03	ISOLATION	MANUAL
6	V-06	BUTTERFLY	3"	HEATING	BOILER B-03	ISOLATION	MANUAL
7	V-07	BUTTERFLY	3"	HEATING	BOILER B-04	ISOLATION	MANUAL
8	V-08	BUTTERFLY	3"	HEATING	BOILER B-04	ISOLATION	MANUAL
9G	V-09G	PLUG	2"	NATURAL GAS	BOILER B-01	ISOLATION	MANUAL
9P	V-09P	PLUG	2"	PROPANE	BOILER B-01	ISOLATION	MANUAL
10G	V-010G	PLUG	2"	NATURAL GAS	BOILER B-02	ISOLATION	MANUAL
10P	V-010P	PLUG	2"	PROPANE	BOILER B-02	ISOLATION	MANUAL
11G	V-011G	PLUG	2"	NATURAL GAS	BOILER B-03	ISOLATION	MANUAL
11P	V-011P	PLUG	2"	PROPANE	BOILER B-03	ISOLATION	MANUAL
12G	V-012G	PLUG	2"	NATURAL GAS	BOILER B-04	ISOLATION	MANUAL
12P	V-012P	PLUG	2"	PROPANE	BOILER B-04	ISOLATION	MANUAL
12	V-12	BUTTERFLY	2"	HEATING	EXPANSION TANK	ISOLATION	MANUAL
13	V-13	BUTTERFLY	6'	HEATING	PRIMARY LOOP	ISOLATION	MANUAL
14	V-14	BUTTERFLY	6"	HEATING	PRIMARY LOOP	ISOLATION	MANUAL
15	V-15	BUTTERFLY	6'	HEATING MAIN	PRIMARY LOOP	CHANGEOVER	AUTOMATIC
16	V-16	BUTTERFLY	6"	HEATING MAIN	PRIMARY LOOP	CHANGEOVER	AUTOMATIC
17	V-17	BUTTERFLY	10"	CHILLED MAIN	PRIMARY LOOP	CHANGEOVER	AUTOMATIC
18	V-18	BUTTERFLY	10"	CHILLED MAIN	PRIMARY LOOP	CHANGEOVER	AUTOMATIC
19	V-19	BUTTERFLY	10"	CAMPUS LOOP	PRIMARY LOOP	ISOLATION	MANUAL
20	V-20	BUTTERFLY	10"	CAMPUS LOOP	PRIMARY LOOP	ISOLATION	MANUAL
21	V-21	BUTTERFLY	2.5"	BLDG 516 SUPPLY	PRIMARY LOOP	ISOLATION	MANUAL
22	V-22	BUTTERFLY	2.5"	BLDG 516 RETURN	PRIMARY LOOP	ISOLATION	MANUAL
23	V-23	BUTTERFLY	10"	PRIMARY PUMP P-01	PRIMARY LOOP	ISOLATION	MANUAL
24	V-24	BUTTERFLY	10"	PRIMARY PUMP P-01	PRIMARY LOOP	BALANCING	MANUAL
25	V-25	CHECK	10"	PRIMARY PUMP P-01	PRIMARY LOOP	FLOW CONTROL	N/A
26	V-26	BUTTERFLY	10"	PRIMARY PUMP P-02	PRIMARY LOOP	ISOLATION	MANUAL
27	V-27	BUTTERFLY	10"	PRIMARY PUMP P-02	PRIMARY LOOP	BALANCING	MANUAL
28	V-28	CHECK	10"	PRIMARY PUMP P-02	PRIMARY LOOP	FLOW CONTROL	N/A
29	V-29	BUTTERFLY	2.5"	PUMP P-06	BLDG 516 HEAT	BALANCING	MANUAL
30	V-30	BUTTERFLY	2.5"	PUMP P-06	BLDG 516 HEAT	ISOLATION	MANUAL
31	V-31	BUTTERFLY	2.5"	PUMP P-06	BLDG 516 HEAT	ISOLATION	MANUAL
32	V-32	CHECK	2.5"	PUMP P-06	BLDG 516 HEAT	FLOW CONTROL	N/A
33	V-33	BUTTERFLY	4"	MAIN CHILLED WATER FEED	BLDG 516 COOL	ISOLATION	MANUAL
34	V-34	BUTTERFLY	4"	MAIN CHILLED WATER FEED	BLDG 516 COOL	ISOLATION	MANUAL
35	V-35	BUTTERFLY	4"	MAIN CHILLED WATER FEED	BLDG 516 COOL	ISOLATION	MANUAL
36	V-36	BUTTERFLY	4"	MAIN CHILLED WATER FEED	BLDG 516 COOL	ISOLATION	MANUAL
37	V-37	BUTTERFLY	8"	CHILLER SYSTEM CH-02	CHILLER CH-02	ISOLATION	MANUAL
38	V-38	BUTTERFLY	8"	CHILLER SYSTEM CH-02	CHILLER CH-02	ISOLATION	MANUAL
39	V-39	BUTTERFLY	8"	CHILLER CH-02 CHILLED	CHILLER CH-02	ISOLATION	MANUAL
40	V-40	BUTTERFLY	8"	CHILLER CH-02 CHILLED	CHILLER CH-02	ISOLATION	MANUAL
41	V-41	BUTTERFLY	8"	CHILLER CH-02 CONDENSER	CHILLER CH-02	ISOLATION	MANUAL
42	V-42	BUTTERFLY	8"	CHILLER CH-02 CONDENSER	CHILLER CH-02	ISOLATION	MANUAL
43	V-43	BUTTERFLY	8"	COOLING TOWER CT-02	COOLING TOWER CT-02	FLOW CONTROL	MANUAL
44	V-44	BUTTERFLY	8"	COOLING TOWER CT-02	COOLING TOWER CT-02	ISOLATION	MANUAL
45	V-45	BUTTERFLY	8"	COOLING TOWER CT-02	COOLING TOWER CT-02	ISOLATION	MANUAL
46	V-46	CHECK	8"	COOLING TOWER CT-02	COOLING TOWER CT-02	ISOLATION	N/A
47	V-47	BUTTERFLY	8"	CHILLER SYSTEM CH-01	CHILLER CH-01	ISOLATION	MANUAL
48	V-48	BUTTERFLY	8"	CHILLER SYSTEM CH-01	CHILLER CH-01	ISOLATION	MANUAL
49	V-49	BUTTERFLY	8"	CHILLER CH-01 CHILLED	CHILLER CH-01	ISOLATION	MANUAL
50	V-50	BUTTERFLY	8"	CHILLER CH-01 CHILLED	CHILLER CH-01	ISOLATION	MANUAL
51	V-51	BUTTERFLY	8"	CHILLER CH-01 CONDENSER	CHILLER CH-01	ISOLATION	MANUAL
52	V-52	BUTTERFLY	8"	CHILLER CH-01 CONDENSER	CHILLER CH-01	ISOLATION	MANUAL
53	V-53	BUTTERFLY	8"	COOLING TOWER CT-01	COOLING TOWER CT-01	FLOW CONTROL	MANUAL
54	V-54	BUTTERFLY	8"	COOLING TOWER CT-01	COOLING TOWER CT-01	ISOLATION	MANUAL
55	V-55	BUTTERFLY	8"	COOLING TOWER CT-01	COOLING TOWER CT-01	ISOLATION	MANUAL
56	V-56	CHECK	8"	COOLING TOWER CT-01	COOLING TOWER CT-01	ISOLATION	N/A
57	V-57	BUTTERFLY	4"	PUMP-05	BLDG 516 COOL	ISOLATION	MANUAL
58	V-58	BUTTERFLY	4"	PUMP-05	BLDG 516 COOL	ISOLATION	MANUAL
59	V-59	BUTTERFLY	4"	CHILLER CH-03 CHILLED	CHILLER CH-03	ISOLATION	MANUAL
60	V-60	BUTTERFLY	4"	CHILLER CH-03 CHILLED	CHILLER CH-03	ISOLATION	MANUAL
61	V-61	BUTTERFLY	4"	CHILLER CH-03 CONDENSER	CHILLER CH-03	ISOLATION	MANUAL
62	V-62	BUTTERFLY	4"	CHILLER CH-03 CONDENSER	CHILLER CH-03	ISOLATION	MANUAL
63	V-63	BUTTERFLY	4"	COOLING TOWER CT-03	COOLING TOWER CT-03	FLOW CONTROL	MANUAL
64	V-64	BUTTERFLY	4"	COOLING TOWER CT-03	COOLING TOWER CT-03	ISOLATION	MANUAL
65	V-65	BUTTERFLY	4"	COOLING TOWER CT-03	COOLING TOWER CT-03	ISOLATION	MANUAL
66	V-66	CHECK	4"	PUMP-05	CHILLER CH-03	ISOLATION	N/A
67	V-67	THREE-WAY	4"	COOLING TOWER CT-03	COOLING TOWER CT-03 BYPASS	FLOW CONTROL	AUTOMATIC
68	V-68	BUTTERFLY	4"	COOLING TOWER CT-03 BYPASS	COOLING TOWER CT-03 BYPASS	ISOLATION	MANUAL
69	V-69	BUTTERFLY	4"	COOLING TOWER CT-03 BYPASS	COOLING TOWER CT-03 BYPASS	ISOLATION	MANUAL
70	V-70	BUTTERFLY	4"	COOLING TOWER CT-03 BYPASS	COOLING TOWER CT-03 BYPASS	ISOLATION	MANUAL
71	V-71	BUTTERFLY	4"	SMALL CHILLED WATER FEED	BLDG 516 COOL	ISOLATION	MANUAL



2/M-400 CENTRIFUGAL PUMP SCHEMATIC

SCALE: NONE



3/M-400 COOLING TOWER MAKEUP WATER SCHEMATIC

SCALE: NONE

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STATE OF TEXAS — MELVIN GARY GLASS — 64955 — REGISTERED PROFESSIONAL ENGINEER — 12/16/19

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CONSTRUCTION DOCUMENTS AUGUST 13, 2018

Rev.#	Date	Initials	Revision Description:

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Drawn By: EMC
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EMC PROJECT #1710052

EMC ENGINEERS

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)

Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN

Sheet M-400
CENTRAL PLANT FLOW DIAGRAM & SCHEMATICS

CENTRIFUGAL PUMP SCHEDULE / SPARE PUMPS TO BE PROVIDED BUT NOT INSTALLED

SYMBOL	P-1 PRIMARY	P-2 BACKUP	P-3	P-4	P-5	P-8	P-9	P-3A OR P4A SPARE	P-5A SPARE	P-6 SPARE	P-7 SPARE	P-8 SPARE	P-9 SPARE
AREA SERVED	CAMPUS	CAMPUS	COOLING TOWER CT-01	COOLING TOWER CT-02	COOLING TOWER CT-03	CHILLER CH-1	CHILLER CH-2	COOLING TOWER CT-01	COOLING TOWER CT-03	BLDG 516	BLDG 516	CHILLER CH-1	CHILLER CH-2
SYSTEM SERVED	CHILLED-HEATING	CHILLED-HEATING	CHILLER 1-CT-1	CHILLER 2-CT-2	CHILLER 3-CT-3	CHILLED	CHILLED	CHILLER 1-CT-1	CHILLER 3-CT-3	CHILLED WATER	HEATING WATER	CHILLED	CHILLED
TYPE	SINGLE SUCTION	SINGLE SUCTION	SINGLE SUCTION	SINGLE SUCTION	SINGLE SUCTION	SINGLE SUCTION	SINGLE SUCTION	SINGLE SUCTION	SINGLE SUCTION	SINGLE SUCTION	SINGLE SUCTION	SINGLE SUCTION	SINGLE SUCTION
MOUNTING	BASE	BASE	BASE	BASE	BASE	BASE	BASE	BASE	BASE	BASE	BASE	BASE	BASE
LOCATION	INDOOR	INDOOR	OUTDOOR	OUTDOOR	OUTDOOR	INDOOR	INDOOR	OUTDOOR	OUTDOOR	INDOOR	INDOOR	INDOOR	INDOOR
FLOW (GPM)	1,300	1,300	985	985	180	840	840	985	180	130	120	840	840
TYPE OF FLUID	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
TOTAL DEVELOPED HEAD (FT)	96	96	50	50	50	48	48	50	50	70	50	48	48
NET POSITIVE SUCTION-NPSH (FT)	12	12	6	6	3	6	6	6	3	5	5	6	6
PUMP EFFICIENCY (%)	80.70%	80.70%	84.00%	84.00%	66.70%	80.00%	80.00%	84.00%	66.70%	67.70%	67.70%	80.00%	80.00%
SPEED (RPM)	1750	1750	1160	1160	1750	1750	1750	1160	1750	1750	1750	1750	1750
MOTOR HORSEPOWER	50	50	20	20	7.5	15	15	20	7.5	3	3	15	15
MOTOR VOLTS AND PHASE	460V/3PH	460V/3PH	460V/3PH	460V/3PH	460V/3PH	460V/3PH	460V/3PH	460V/3PH	460V/3PH	460V/3PH	460V/3PH	460V/3PH	460V/3PH
MOTOR STARTERS NEMA SIZE	NEMA SIZE 3	NEMA SIZE 3	NEMA SIZE 2	NEMA SIZE 2	NEMA SIZE 1	NEMA SIZE 2	NEMA SIZE 2	N/A	N/A	N/A	N/A	N/A	N/A
MOTOR CONTROL	EMCS VFD	EMCS VFD	EMCS	EMCS	EMCS	EMCS	EMCS	N/A	N/A	N/A	N/A	N/A	N/A
TACO MODEL	F16013	F16013	F16013	F16013	F12009C	F15009D	F15009D	F16013	F12009C	F12009C	F11507	F15009D	F15009D

NOTES
1. PUMPS ARE SCHEDULED TO BE BY TACO. EQUIVALENT MANUFACTURERS ARE BELL & GOSSETT (B&G), PACO, ARMSTRONG, AND AURORA.
2. PROVIDE EACH INSTALLED PUMP WITH DRIP PAN, MAGNETIC STARTER (VARIABLE FREQUENCY DRIVE AS INDICATED) WITH HOA SWITCH, OUTDOOR WEATHER RATED IF OUTDOOR INSTALLATION, AND HIGH EFFICIENCY MOTOR.
3. PROVIDE EACH PUMP WITH MECHANICAL SEALS WITH CERAMIC SEATS.
4. FACTORY TRIM THE IMPELLER TO MATCH FLOW RATE AND HEAD INDICATED ABOVE.
5. PROVIDE EACH END SUCTION PUMP WITH FLEXIBLE COUPLING GUARD.
6. ON EACH INSTALLED PUMP PROVIDE AND INSTALL VALVES AND ACCESSORIES PER SCHEMATIC ON DRAWINGS.
7. PROVIDE EACH INSTALLED PUMP WITH CHECK-OUT AND START-UP SERVICES FROM AN AUTHORIZED REPRESENTATIVE OF THE PUMP MANUFACTURER.
8. PUMPS P-3, P-4, P-5, P-8, AND P-9 ARE TO EACH HAVE AN ADDITIONAL IDENTICAL SPARE PUMP P-3A, P-4A, AND P-5A PROVIDED BY THIS CONTRACT. THESE SPARE PUMPS ARE TO BE TURNED OVER TO THE OWNER AND NOT BE INSTALLED.
9. PUMPS P-6, AND P-7 ARE EXISTING ONSITE PUMPS THIS CONTRACT IS TO PROVIDE IDENTICAL SPARE PUMPS. THESE SPARE PUMPS ARE TO BE TURNED OVER TO THE OWNER AND NOT BE INSTALLED.

COOLING TOWER SCHEDULE

SYMBOL	CT-1	CT-2	CT-3
UNIT SERVED	CHILLERS 1 CAMPUS	CHILLER 2 CAMPUS	CHILLER 3 BLDG 516
LOCATION	OUTSIDE BLDG	OUTSIDE BLDG	OUTSIDE BLDG
TYPE	COUNTERFLOW	COUNTERFLOW	COUNTERFLOW
NOMINAL TONNAGE	356	356	60
NUMBER OF CELLS	4	4	1
RATED GPM	1,050	1,050	180
CONNECTION SIZE (IN)	8.0	8.0	4.0
WATER SIDE PERFORMANCE			
ENTERING WATER TEMPERATURE oF (DB)	95	95	95
LEAVING WATER TEMPERATURE oF (DB)	85	85	85
DESIGN WET BULB TEMPERATURE oF (WB)	75	75	75
FAN PERFORMANCE			
AIRFLOW (CFM)	16,040 EA	16,040 EA	10,800
DISCHARGE	UPBLAST	UPBLAST	UPBLAST
TYPE OF DRIVE	VFD DIRECT	VFD DIRECT	VFD DIRECT
SPEED (RPM)	860	860	865
TYPE OF FAN	ADJ PITCH	ADJ PITCH	ADJ PITCH
NUMBER OF FANS	4	4	1
FAN MOTOR HP-DRIVE-SPEED	3 HP EA	3 HP EA	3 HP
CONTROL METHOD	VFD	VFD	VFD
SUMP			
OVERFLOW CONNECTION (IN)	6"	6"	1"
MAKEUP WATER CONNECTION (IN)	2"	2"	1"
HEATER CAPACITY (KW)	(2) @ 6KW	(2) @ 6KW	(2) @ 6KW
ELECTRICAL			
COOLING TOWER			
FLA	22.4 FLA	22.4 FLA	22.4 FLA
VOLTAGE/PHASE	460V/3PH	460V/3PH	460V/3PH
MOTOR STARTERS NEMA SIZE	NEMA SIZE 2	NEMA SIZE 2	NEMA SIZE 0
MOTOR CONTROL	EMCS VFD	EMCS VFD	EMCS VFD
SUMP (SEPARATE CONNECTION)			
FLA	16.0 FLA	16.0 FLA	16.0 FLA
VOLTAGE/PHASE	460V/3PH	460V/3PH	460V/3PH
OPERATING WEIGHT (LB)	13,800	13,800	5,105
TOWER TECH MODEL	TTXR-041930 (1)	TTXR-041930 (1)	TTXR-011930 (1)

NOTES:
1. UNITS ARE SCHEDULED TO BE MANUFACTURED BY TOWER TECH. EQUIVALENT MANUFACTURERS ARE EVAPCO, AND MARLEY.
2. UNIT TO BE MOUNTED ON 6" HOUSEKEEPING PAD AND SPRING ISOLATORS. UNIT TO HAVE SIX (6) FOOT STAND LEGS.
3. UNIT SHALL HAVE A SINGLE POINT OF ELECTRICAL CONNECTION. UNIT SHALL HAVE FACTORY MOUNTED MAGNETIC STARTERS (VFD), DISCONNECTS, AND WIRING FOR ALL ELECTRICAL AND CONTROL COMPONENTS INCLUDING FAN MOTORS AND SUMP HEATER.
4. AIRFLOW CONDITIONS RATED AT 2,024 FEET ALTITUDE.
5. FOR OPERATING CONTROLS REFER TO SPECIFICATIONS AND SCHEDULES.

GAS FIRED HEATING WATER BOILER SCHEDULE

SYMBOL	B-01, B-03	B-02, B-04
AREA SERVED	CAMPUS	CAMPUS
RATINGS		
TYPE OF BOILER	CONDENSING	CONDENSING
TYPE OF DUAL FUEL	NATURAL GAS/PROPANE	NATURAL GAS/PROPANE
INPUT, MBH	3000 MBH EA	4000 MBH EA
OUTPUT, MBH	2289 MBH EA	3876 MBH EA
EFFICIENCY (%)	96.0%	96.0%
FLUE SIZE (IN)	12.0	14.0
HEAT TRANSFER MEDIA		
TYPE OF FLUID	100%WATER	100%WATER
OUTLET WATER TEMPERATURE, oF	140.0	140.0
WATER TEMPERATURE RISE oF	40.0	40.0
BURNER TYPE	FORCED DRAFT	FORCED DRAFT
BOILER ELECTRICAL INFORMATION		
VOLTAGE/PHASE	208V/3PH	208V/3PH
MINIMUM CIRCUIT AMPACITY	16	22
MINIMUM OVERCURRENT PROTECTION	30	30
SAFETY VALVES (QUANTITY) (SEE NOTE 2)	1	1
SAFETY VALVES RELIEF PRESSURE (PSI)	45	45
ASSOCIATED BOILER CIRCULATION PUMP		
SYMBOL	BP-01, BP-03	BP-02, BP-04
TYPE	VERTICAL CLOSE COUPLE INLINE	VERTICAL CLOSE COUPLE INLINE
MOUNTING	INTERNAL TO BOILER	INTERNAL TO BOILER
FLOW (GPM)	180	180
TYPE OF FLUID	100%WATER	100%WATER
TOTAL DEVELOPED HEAD (FT)	30	30
SPEED (RPM)	1750	1750
MINIMUM CIRCUIT AMPACITY	8.2	8.2
MINIMUM OVERCURRENT PROTECTION	20	20
MOTOR VOLTS AND PHASE	240V/1PH	240V/1PH
PUMP WEIGHT (LBS.)	100	100
BOILER WEIGHT WITH PUMP (LBS.)	3000	3000
FULTON BOILER MODEL	VTG-3000	VTG-4000

NOTES
1. BOILERS AND PUMPS ARE SCHEDULED TO BE MANUFACTURED AND SUPPLIED BY FULTON; EQUIVALENT MANUFACTURERS ARE RAYPAK, LOCHINVAR, RBI.
2. BOILER TO BE DUAL FUEL WITH NATURAL GAS AND PROPANE GAS TRAINS. NATURAL GAS PRESSURE SHALL BE A MINIMUM OF 14 INCHES WC AND PROPANE SHALL BE A MINIMUM 17 INCHES WC.
3. IF HEATING SURFACE AREA GREATER THAN 500 SQ FT PROVIDE A MINIMUM OF TWO SAFETY VALVES.

MINIMUM HYDRONIC PIPE MATERIAL REQUIREMENTS SCHEDULE

UNLESS SPECIFIED OTHERWISE, THE FOLLOWING SCHEDULE SHALL BE USED TO DETERMINE THE MINIMUM ACCEPTABLE MATERIAL TYPES USED FOR EACH PLUMBING APPLICATION LISTED. DEVIATIONS FROM THIS SCHEDULE UNLESS ALLOWED FOR IN THE SPECIFICATIONS PRODUCED BY THIS OFFICE FOR THIS PROJECT, ARE AT THE CONTRACTORS RISK. SELECTING PIPE MATERIALS OTHER THAN AS SCHEDULED BELOW MUST BE IN ACCORDANCE TO LOCAL, STATE, AND FEDERAL BUILDING STANDARDS INCLUDING NFPA. ANY DEVIATION FROM THIS SCHEDULE AND/OR SPECIFICATIONS FROM THIS PROJECT THEREBY WAIVE EMC ENGINEERS, FROM ANY LIABILITY ARISING FROM BUILDING CODE VIOLATIONS.

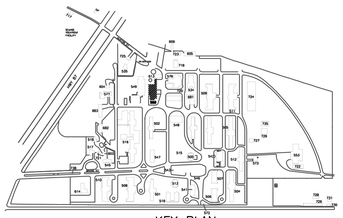
PLUMBING SERVICE	LOCATION	MATERIALS REQUIRED
HEATING WATER SEE NOTE 1	BELOW GRADE, OUTSIDE OF 5'-0" OF BUILDING	AQUATHERM BLUE PIPE SDR 7.4/11 MF, 2" PRE INSULATED
	BELOW GRADE, WITHIN OF 5'-0" OF BUILDING	AQUATHERM BLUE PIPE SDR 7.4/11 MF, 2" PRE INSULATED
	ABOVE GRADE, WITHIN BUILDING	AQUATHERM BLUE PIPE SDR 7.4/11 MF
CHILLED WATER SEE NOTE 1	BELOW GRADE, OUTSIDE OF 5'-0" OF BUILDING	AQUATHERM BLUE PIPE SDR 7.4/11 MF, 2" PRE INSULATED
	BELOW GRADE, WITHIN OF 5'-0" OF BUILDING	AQUATHERM BLUE PIPE SDR 7.4/11 MF, 2" PRE INSULATED
	ABOVE GRADE, WITHIN BUILDING	AQUATHERM BLUE PIPE SDR 7.4/11 MF
CONDENSER WATER SEE NOTE 1	BELOW GRADE, OUTSIDE OF 5'-0" OF BUILDING	AQUATHERM BLUE PIPE SDR 7.4/11 MF, 2" PRE INSULATED
	BELOW GRADE, WITHIN OF 5'-0" OF BUILDING	AQUATHERM BLUE PIPE SDR 7.4/11 MF, 2" PRE INSULATED
	ABOVE GRADE, WITHIN BUILDING	AQUATHERM BLUE PIPE SDR 7.4/11 MF
CONDENSATE DRAIN	WITHIN OF 5'-0" OF BUILDING	AQUATHERM BLUE PIPE SDR 7.4/11 MF UV OR UPONOR EQUAL

NOTES:
1. HEATING, CHILLED, AND CONDENER PIPING UNDERGROUND JOINTS SHALL BE WELDED, ABOVE GROUND SHALL BE THREADED FOR 2-1/2 IN OR LESS AND FLANGED [OR GROOVED CONNECTIONS] FOR 3 IN AND LARGER.
2. STEAM AND STEAM CONDENSATE PIPING UNDERGROUND JOINTS SHALL BE WELDED, ABOVE GROUND SHALL BE THREADED FOR 2-1/2 IN OR LESS AND FLANGED FOR 3 IN AND LARGER.
3. VALVE SHALL BE BALL OR BUTTERFLY RATED FOR 150 PSI WOG, THREADED FOR 2-1/2 IN OR LESS AND FLANGED FOR 3 IN AND LARGER.

ENERGY CODE - HYDRONIC SERVICE WATER PIPING INSULATION CRITERIA

SERVICE PIPING	SPECIFIED PER SPECIFICATIONS	CODE REQUIRED (NOTE 1)
HEATING WATER	1-1/2" AND BELOW - 1-1/2" THICK @ 0.24 BTUH/INCH/SQ FT/DEG F 2" AND ABOVE - 2.0" THICK @ 0.24 BTUH/INCH/SQ FT/DEG F	1-1/2" AND BELOW - 1-1/2" THICK @ 0.27 BTUH/INCH/SQ FT/DEG F 2" AND ABOVE - 2.0" THICK @ 0.27 BTUH/INCH/SQ FT/DEG F
CHILLED WATER BRINE	1-1/2" AND BELOW - 1/2" THICK @ 0.24 BTUH/INCH/SQ FT/DEG F 2" AND ABOVE - 1" THICK @ 0.24 BTUH/INCH/SQ FT/DEG F	1-1/2" AND BELOW - 1/2" THICK @ 0.27 BTUH/INCH/SQ FT/DEG F 2" AND ABOVE - 1.0" THICK @ 0.27 BTUH/INCH/SQ FT/DEG F
COLD WATER	ALL SIZES - 1" THICK @ 0.24 BTUH/INCH/SQ FT/DEG F	1-1/4" & BELOW - 1/2" THICK @ 0.27 BTUH/INCH/SQ FT/DEG F 1-1/2" TO 3" - 1" THICK @ 0.27 BTUH/INCH/SQ FT/DEG F

NOTES:
1. REQUIRED PER REQUIREMENTS OF ICC ENERGY CONSERVATION CODE 2015.
2. PIPING EXPOSED TO THE EXTERIOR SHALL BE JACKETED WITH ALUMINUM JACKET: ASTM B209, THICKNESS: 0.016 INCH SHEET, FINISH: SMOOTH, JOINING: LONGITUDINAL SLIP JOINTS AND 2 INCH LAPS, FITTINGS: 0.016 INCH THICK DIE SHAPED FITTING COVERS WITH FACTORY ATTACHED PROTECTIVE LINER, METAL JACKET BANDS: 3/8 INCH WIDE; 0.015 INCH THICK ALUMINUM.



STATE OF TEXAS
MELVIN GARY GLASS
64955
LICENSED
PROFESSIONAL ENGINEER

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CONSTRUCTION DOCUMENTS AUGUST 13, 2018

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EMC PROJECT #1710052
ENGINEERS

Designed By: EMC
Drawn By: EMC
Checked By: EMC
Scale: AS SHOWN

Rev. #	Date	Initials	Revision Description:

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)
Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN
Sheet M-401 SCHEDULES

ENERGY MANAGEMENT CONTROL SYSTEM (EMCS) – SEQUENCE OF OPERATIONS

EXISTING ENERGY MANAGEMENT CONTROL SYSTEM

1. THE EXISTING EMCS SYSTEM IS SCHNEIDER ELECTRIC INC. (VISTA SYSTEM). ALL NEW EMCS WORK SHALL BE SCHNEIDER ELECTRIC INC. (VISTA SYSTEM). ALL COMPONENTS BEING USED SHALL BE 100% BACNET CERTIFIED

CENTRAL PLANT

1. THE PLANT HAS THE SWITCH-OVER VALVES AND MAIN WATER LOOP PUMPS FOR THE HEATING AND COOLING SYSTEMS FOR THE CAMPUS. THE CHILLED WATER SYSTEM IS ALSO AT THIS LOCATION AND PROVIDES THE COOLING FOR THE CAMPUS WITH THREE (3) WATER COOLED CHILLERS.
   - A. THE HEATING AND COOLING IS A TWO (2) PIPE SEASONAL SWITCH-OVER SYSTEM FOR THE CAMPUS. BUILDING 516 HAS A FOUR (4) PIPE SYSTEM FROM THE SAME CENTRAL PLANT AND HEATING PLANT.
     - 1.0 THE EMCS CONTROLLER SHALL START A CHILLED WATER PUMP (P-1 OR P-2) THROUGH A CONTACT CLOSUR OF THE PUMPS VARIABLE FREQUENCY DRIVE (VFD) RUN-ENABLE CONTACTS.
     - 2.0 THE EMCS CONTROLLER SHALL DETECT CHILLED WATER PUMP (P1 OR P-2) RUN STATUS BY A VFD CURREN SWITCH.
     - 3.0 THE PRIMARY WATER PUMP (P-1 AND 2) LEAD/LAG SEQUENCE SHALL BE ROTATED ON A WEEKLY SCHEDULE. THE SEQUENCE SHALL BE BASED ON CALCULATED RUN TIME WITH THE PUMP HAVING THE LEAST RUN TIME AS LEAD, THE PUMP WITH THE NEXT LOWEST RUN TIME WILL BE THE SECOND IN THE SEQUENCE AND SO OF FROM THE EMCS IT SHALL BE ABLE TO MANUALLY CHANGE THE LEAD/LAG SEQUENCE.
     - 4.0 IF THE LEAD START/STOP RELAY IS ENABLED AND THE CURRENT SWITCH STATUS IS OFF FOR MORE THAN 30 SECONDS (ADJ.), THE EMCS CONTROLLER SHALL ANNUNCIATE A CHILLED WATER PUMP FAILURE ALARM TO THE EMCS AND START THE NEXT PUMP IN ONCE THE PROBLEM HAS BEEN CORRECTED, THE OPERATOR SHALL BE ABLE TO CLEAR THE ALARM FAILURE FROM THE EMCS CONTROLLER AND FROM A EMCS OR BY MANUALLY OVERRIDING THE PUMP ON MOMENTARILY. THIS SHALL RE-ENABLE THE LEAD/LAG SEQUENCE.
     - 5.0 THE EMCS CONTROLLER SHALL MONITOR THE CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE SENSOR. WHEN THE PUMP VARIABLE FREQUENCY DRIVE IS ENABLED, THE EMCS CONTROLLER SHALL CONTROL THE ANALOG SPEED SIGNAL THAT IS SENT TO THE PUMP VARIABLE FREQUENCY DRIVE TO MAINTAIN A CHILLED WATER DIFFERENTIAL PRESSURE SETPOINT OF 15.0 PSIG (ADJ.).
     - 6.0 WHEN THE SEASONAL CHANGER SWITCHOVER VALVES (V-16, V-17, V-18, V-19) ARE IN THE 'COOLING MODE' THE EMCS THE CHILLER PLANT SHALL OPERATE AS DESCRIBED.
     - 7.0 WHEN THE SEASONAL CHANGER SWITCHOVER VALVES (V-16, V-17, V-18, V-19) ARE IN THE 'HEATING MOD THE EMCS THE CHILLER PLANT SHALL BE OFF AND THE HEATING PLANT SHALL OPERATE PER THE SEQUENCE

COOLING TOWER CHILLED WATER PLANT

1. THE CONDENSER WATER SYSTEM CONSISTS OF THE FOLLOWING: TWO (2) CAMPUS CHILLERS (CH-1 AND 2) WITH ONE (1) CONDENSER WATER PUMP/COOLING TOWER (CT-1 AND 2) FOR EACH CHILLER. BUILDING 516 CHILLER HAS ONE (1) CONDENSING WATER PUMP WATER PUMP WITH COOLING TOWER (CT-3) BYPASS VALVE.
   - A. EACH OF THE THREE (3) WATER COOLED CHILLERS WILL HAVE A NEW HIGH EFFICIENCY GROUND MOUNTED COOLING TOWER THAT HAS A VARIABLE SPEED FAN CONTROL WITH CONSTANT VOLUME PUMPS AND BUILDING 516 HAS A BYPASS VALVE.
     - 1.0 THE BUILDING AUTOMATION SYSTEM (BAS) CONTROLLER PROVIDES STAND-ALONE CONTROL OR CONTROL FROM A HIGHER LEVEL BAS OF THE CONDENSER WATER SETPOINT (ADJ.) BY CONTROLLING THE TOWER FAN VFD ENABLE/DISABLE AND SPEED CONTROL INPUTS AND THE TOWER BYPASS VALVE POSITION SIGNAL INPUT. THE CONTROLLER AND OPTIONAL HIGHER LEVEL BAS ALSO CONTROLS THE CHILLER CONDENSER DIFFERENTIAL PRESSURE SETPOINT (ADJ.) BY CONTROLLING THE CONDENSER WATER PUMP VFD ENABLE/DISABLE AND SPEED CONTROL INPUTS.
     - 2.0 THE CONDENSER WATER SYSTEM SHALL BE ENABLED ON A CONTACT CLOSURE FROM EITHER CHILLER. WHEN ENABLED, THE BAS CONTROLLER SHALL START THE LEAD CONDENSER WATER PUMP AND CONTROL THE COOLING TOWER FANS AND TOWER BYPASS VALVE TO MAINTAIN THE CONDENSER WATER SETPOINT (ADJ.). AS ADDITIONAL CHILLERS MAKE CONDENSER WATER REQUESTS, THE LAG PUMP WILL BE ENABLED. WHEN THE CONDENSER WATER SYSTEM IS DISABLED, THE CONDENSER WATER PUMP AND COOLING TOWER FAN SHALL BE OFF.
     - 3.0 THE BAS CONTROLLER SHALL START A CONDENSER WATER PUMP THROUGH A CONTACT CLOSURE OF THE PUMPS VARIABLE FREQUENCY DRIVE (VFD) RUN-ENABLE CONTACTS.
     - 4.0 THE BAS CONTROLLER SHALL DETECT CONDENSER WATER PUMP RUN STATUS BY A VFD CURRENT SWITCH.
     - 5.0 IF THE START/STOP RELAY IS ENABLED AND THE CURRENT SWITCH STATUS IS OFF FOR MORE THAN 30 SECONDS (ADJ.), THE BAS CONTROLLER SHALL ANNUNCIATE A CONDENSER WATER PUMP SHALL ANNUNCIATE A CONDENSER WATER PUMP FAILURE ALARM TO THE BAS. ONCE THE PROBLEM HAS BEEN CORRECTED, THE OPERATOR SHALL BE ABLE TO CLEAR THE ALARM FAILURE FROM THE EMCS CONTROLLER FROM A BAS OR BY MANUALLY OVERRIDING THE PUMP ON MOMENTARILY.
     - 6.0 COOLING TOWER FAN SEQUENCE SHALL BE ROTATED ON A WEEKLY SCHEDULE. FROM THE EMCS OR THE SERVICE TOOL AN OPERATOR SHALL BE ABLE TO MANUALLY CHANGE THE STAGING SEQUENCE. WHEN A CHILLER IS OPERATING AND THE COOLING TOWER EMCS IN TEMPERATURE RISES TO 2.0 DEG. F (ADJ.) ABOVE THE CURRENT TOWER LEAVING WATER SETPOINT THE COOLING TOWER LEAD TOWER FAN SHALL BE TURNED ON AT MINIMUM SPEED AND THE DDC CONTROL LOOP ENABLED. THE SYSTEM SHALL THEN INCREASE FAN SPEED (ADJ) FOR 3 MINUTES (ADJ.). THE FAN SPEED SHALL BE INCREASED UNTIL THE SETPOINT (ADJ.) IS MEET. IF THE CONDENSER WATER IS BELOW SET POINT (ADJ.) THE FAN SPEED SHALL BE DECREASED UNTIL SETPOINT IS REACHED.
     - 7.0 THE EMCS CONTROLLER SHALL START A TOWER FAN THROUGH A CONTACT CLOSURE OF THE FAN VFD RUN-ENABLE CONTACTS.
     - 8.0 THE EMCS CONTROLLER SHALL DETECT TOWER FAN STATUS BY A VFD CURRENT SWITCH.
     - 9.0 BUILDING 516, WHEN THE CONDENSER WATER SYSTEM IS ENABLED, THE COOLING TOWER SHALL MAINTAIN THE ENTERING CONDENSER WATER TEMPERATURE BY FIRST MODULATING THE NORMALLY OPEN BYPASS AND THE ENTERING CONDENSER WATER TEMPERATURE IS GREATER THAN THE ENTERING CONDENSER WATER TEMPERATURE SETPOINT MINUS 2.0 DEG. F (ADJ.), THE BYPASS VALVE SHALL BEGIN TO CLOSE SENDING WATER TO THE COOLING TOWER. THE BYPASS VALVE SHALL CONTINUE TO MODULATE CLOSED TO MAINTAIN THE ENTERING CONDENSER WATER TEMPERATURE SETPOINT WITHOUT THE TOWER FANS. WHEN THE BYPASS VALVE IS FULLY CLOSED AND THE ENTERING CONDENSER WATER TEMPERATURE REACHES CONDENSER WATER TEMPERATURE SETPOINT PLUS 2.0 DEG. F (ADJ.) THE CONDENSER WATER TEMPERATURE SHALL BE MAINTAINED BY OPERATING THE COOLING TOWER FANS TO MAINTAIN THE ENTERING CONDENSER WATER TEMPERATURE SETPOINT.
     - 9.0 THE SUMP HEAT SHALL ONLY BE ENABLED WHEN THE OUTDOOR TEMPERATURE IS BELOW 38.0 DEG. F (ADJ.) AND THE SYSTEM IS DISABLED. LEVEL ALARMS: A MULTIPLE POSITION COOLING TOWER SUMP LEVEL SENSOR SHALL PROVIDE THE FOLLOWING INFORMATION TO THE EMCS: HIGH AND LOW WATER ALARM SUMP HEATER: ALL COOLING TOWERS SHALL HAVE A SUMP TEMPERATURE SENSOR AND SUMP HEATER COOLING TOWER SUMP HEATERS SHALL BE CONTROLLED TO MAINTAIN A SUMP TEMPERATURE OF 45.0 DEG. F (ADJ.) WITH THE FOLLOWING SCHEDULE. OUTSIDE AIR TEMPERATURE CONTROLLED 45.0 DEG. F (ADJ.) ON AND 48.0 DEG. F (ADJ.) OFF.

BOILER HEATING WATER PLANT

1. HOT WATER HEATING SYSTEM; THE HOT WATER SYSTEM CONSISTS OF FOUR (4) HEATING WATER BOILERS AND ASSOCIATED PUMPS. THE ENERGY MANAGEMENT CONTROL SYSTEM (EMCS) CONTROLLER SHALL PROVIDE STAND-ALONE CONTROL OR EMCS WORKSTATION CONTROL OF THE SUPPLY HEATING WATER TEMPERATURE SETPOINT (ADJ.) BY CONTROLLING THE BOILERTS ENABLE/DISABLE BOILER SIGNAL. THE EMCS CONTROLLER'S SHALL BE PASSWORD PROTECTED TO PREVENT UNAUTHORIZED ACCESS.
   - A. BOILERS B-1 AND B-2 ARE THE INITIAL LEAD/LAG BOILER PAIR, BOILERS B3 AND B4 ARE INITIALLY THE LAG BOILER PAIR. BOILERS B-3 AND B-4 ARE 100% REDUNDANT BOILERS, ONLY BOILER B-1 AND B-2 ARE NEEDED TO TO MAINTAIN THE CAMPUS HEATING LOADS. THIS SEQUENCE IS TO UTILIZE THE BOILER PAIR B-1 AND B-2 B-3 AND B-4 AS THE PRIMARY HEATING WITH TH OTHER PAIR SERVING AS BACKUP FOR THE PLANT.
   - B. HEATING WATER BOILERS SHALL OPERATE AS FOLLOWS:
     - 1.0 THE BOILERS SHALL MODULATE AS DESCRIBED BELOW TO SHALL MAINTAIN A 20 DEGREE F DIFFERENTIAL (ADJUSTABLE) BETWEEN THE SUPPLY AND RETURN WATER TEMPERATURES.
     - 2.0 SUPPLY TEMPERATURES:
       - a. THE SUPPLY TEMPERATURE SHALL BE BASED UPON OUTSIDE AIR TEMPERATURE AS FOLLOWS:
         - 1) WHEN OUTSIDE AIR TEMPERATURE IS 0 DEGREES F (ADJUSTABLE) OUTSIDE THE SUPPLY WATER TEMPERATURE SHALL BE 140 DEGREES F MAXIMUM.
         - 2) WHEN OUTSIDE AIR TEMPERATURE IS 55 DEGREES F (ADJUSTABLE) OUTSIDE THE SUPPLY WATER TEMPERATURE SHALL BE 100 DEGREES F.
         - 3) THE SUPPLY HEATING WATER TEMPERATURE RATE OF CHANGE SHALL BE LINEAR BETWEEN THESE TWO POINTS.
     - 2.0 WHEN THE CHANGEOVER MODE IS 'HEATING' THE ASSOCIATED BOILERS SHALL OPERATE AS FOLLOWS:
       - a. BOILER (B-1) SHALL MODULATE ON OWN CONTROLS WITH IT ASSOCIATED CIRCULATION PUMP ON. TO PROVIDE THE SUPPLY WATER TEMPERATURE REQUIRED BY THE OUTSIDE AIR TEMPERATURE WHEN IN 'HEATING' MODE
       - b. WHEN BOILER (B-1) CAN NO LONGER MAINTAIN THE SUPPLY WATER TEMPERATURE BOILER (B-2), SHALL BE ALLOWED TO OPERATE TO MAINTAIN THE SUPPLY WATER TEMPERATURE AND BOILER (B-1) SHALL MODULATE TO SHUTDOWN
       - c. WHEN BOILER B-2 CAN NO LONGER MAINTAIN THE SUPPLY WATER TEMPERATURE. BOILER B-1 SHALL BE ALLOWED TO OPERATE AND THE TWO BOILERS SHALL MODULATE AS REQUIRED TO MAINTAIN THE SUPPLY WATER TEMPERATURE.
       - d. AFTER 100 HOURS (ADJUSTABLE) OF BOILERS (B-1 AND B-2) OPERATIONS AS THE PRIMARY BOILERS SHALL SWITCH POSITION TO MAKING BOILER (B-3 AND B-4) OPERATIONAL WITH THE PRIMARY BOILER BEING B-3 AND BOILER (B-4) THE SECOND BOILER. AFTER AND ADDITIONAL 100 HOUR PERIOD (ADJUSTABLE) THE BOILERS SHALL REVERSE LEAD LAG POSITION AND SHALL BE REPEATED AS REQUIRED.

EMCS POINT LIST

San Angelo SSLC Central Plant and Generator Upgrades

SYSTEM POINT DESCRIPTION	ANALOG INPUT: GRAPHIC	TEMPERATURE	PRESSURE	PERCENT	PERCENT RLA	TONS	ANALOG OUTPUT: DDC	GPM	SETPOINT ADJ.		BINARY INPUT: PRESS. TRANSDUCER	STATUS ON / OFF	FILTER STATUS	STATUS OPEN/CLOSED	STATUS	BINARY OUTPUT: OFF / ON	OPEN / CLOSED	LOCKOUT	ENABLE / DISABLE	COOLING TOWER FAN SPEED (VFD)	LEAD/LAG	SYSTEM FEATURES – ALARMS: BYPASS VALVE	HIGH ANALOG	LOW ANALOG	BINARY	PROOF	SENSOR FAIL	FLOW FAIL	COMM. FAIL	DIAGNOSTICS	LATCHING	LIMIT WARNING	PROGRAMS: TIME SCHEDULING	OPT. START / STOP	DEMAND LIMITING	RESET	EVENT PROGRAM	DDC	ALARM INSTRUCT	MAINT. WK. ORDER	RUN TIME	EXP. MESSAGE	SET BACK / SET UP	NIGHT PURGE	TENANT BILLING	CHILLER SEQUENCING	TOTALIZING	TIMED OVERRIDE	MODE CONTROL	NOTES:
CHILLED WATER CENTRAL PLANT																																																				
CAMPUS EXISTING CHILLED WATER CHILLERS CH-1 AND CH-2 (2)	X	X							X			X				X		X	X		X				X		X	X	X				X			X					X				X		X			
CHILLER (CH-1 AND CH-3) CHILLED WATER PUMPS (P-8 AND P-9) (2)	X	X							X			X				X		X	X	X	X		X	X	X	X	X	X	X				X								X							X			
BLDG 516 (SEASONABLE) EXISTING CHILLED WATER CHILLER CH-3	X	X							X			X				X		X	X		X	X			X		X	X	X				X			X					X				X		X			2
BLDG 516 (SEASONABLE) EXISTING CHILLED WATER PUMP (P-6)	X	X							X			X				X		X	X	X	X		X	X	X	X	X	X	X				X								X							X			
BLDG 516 EXISTING HEATING WATER PUMP (P-5)	X	X							X			X				X		X	X	X	X		X	X	X	X	X	X	X				X								X							X			
CAMPUS WATER PRIMARY PUMPS, P-1 & P-2 (LEAD/LAG)	X	X							X			X				X		X	X		X				X		X	X	X				X								X				X		X			
COOLING TOWER CT 1 FOR CH-1	X	X							X			X				X		X	X	X									X				X																		
COOLING TOWER CT 2 FOR CH-2	X	X							X			X				X		X	X	X									X				X																		
COOLING TOWER CT 3 FOR CH-3	X	X							X			X				X		X	X	X		X							X				X																		
CT-1 COOLING TOWER WATER PUMP, P-3	X	X							X			X				X		X	X	X	X		X	X	X	X	X	X	X				X								X							X			
CT-2 COOLING TOWER WATER PUMP, P-4	X	X							X			X				X		X	X	X	X		X	X	X	X	X	X	X				X								X							X			
CT-3 COOLING TOWER WATER PUMP, P-5	X	X							X			X				X		X	X	X	X	X	X	X	X	X	X	X	X				X								X							X			
HEATING/CHILLED WATER SWITCHOVER VALVES (SUPPLY AND RETURN) V-16, V-17, V-18, AND V-19 (4)	X										X		X				X																X																		
HEATING WATER CENTRAL PLANT																																																				
GAS FIRED HEATING WATER BOILER B-1 TO B-4 (WITH INTERGAL PUMP) (4)	X	X							X			X				X		X	X		X				X	X	X		X				X			X					X						X			1

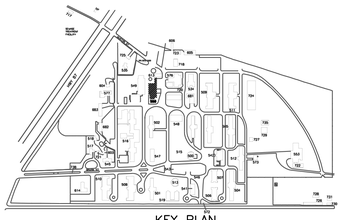
GENERAL NOTES:

Note 1 Boilers have their own controller (provided with boilers) that must be installed and wired per manufactures instructions by EMCS. Boiler manufactures controller will be integrated into EMCS system.

Note 2 Chiller for building 516 will have condenser bypass valve.

Note 3 The existing energy management control system (EMCS) is a Schneider Electric Inc. (Vista System). Located in Plant Maintenance Manager office in Bldg 681

Note 4 All new energy management control system (EMCS) equipment shall be 100% BACnet Certified and compatable with the existing energy management control system.



KEY PLAN

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EMC PROJECT #1710052

Rev. #	Date	Initials	Revision Description:

Designed By: EMC
Drawn By: EMC
Checked By: EMC
Scale: AS SHOWN

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)

Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN

Sheet M-402
SEQUENCE OF OPERATIONS AND POINTS LIST
8 of: 8

ELECTRICAL GENERAL NOTES:

1. THESE ELECTRICAL GENERAL NOTES ARE APPLICABLE TO ALL ELECTRICAL SHEETS IN THIS PROJECT SET.

2. THE ELECTRICAL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE APPLICABLE AND ADOPTED PROVISIONS OF THE FOLLOWING CODES:
   2017 NATIONAL ELECTRICAL CODE
   2012 INTERNATIONAL BUILDING CODE
   2012 INTERNATIONAL PLUMBING CODE
   2012 INTERNATIONAL MECHANICAL CODE
   2012 INTERNATIONAL FIRE CODE
   2012 INTERNATIONAL FUEL CODE
   2015 INTERNATIONAL ENERGY CONSERVATION CODE
   AS ADOPTED AND INTERPRETED BY THE STATE OF TEXAS, TEXAS HEALTH AND HUMAN SERVICES COMMISSION STANDARDS AND GUIDELINES, AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) REGULATIONS, CURRENT ADOPTED EDITION REGARDING MECHANICAL SYSTEMS, FIRE PROTECTION AND ALARM SYSTEMS AND ASSOCIATED PLUMBING AND ELECTRICAL SYSTEMS. ALL LABOR AND MATERIALS NECESSARY TO COMPLY WITH RULES, REGULATIONS AND ORDINANCES SHALL BE PROVIDED. WHERE THE DRAWINGS INDICATE MATERIALS OR CONSTRUCTION IN EXCESS OF CODE REQUIREMENTS, THE DRAWINGS SHALL GOVERN. THE CONTRACTOR SHALL HOLD AND SAVE THE OWNER AND ENGINEER FREE AND HARMLESS FROM LIABILITY OF ANY NATURE OR KIND ARISING FROM HIS FAILURE TO COMPLY WITH ALL APPLICABLE CODES AND ORDINANCES.

3. THE CONTRACTOR SHALL COORDINATE WITH OWNER, ARCHITECT, AND ENGINEER ANY WORK THAT HAS THE POTENTIAL TO HINDER ELECTRICAL SERVICES TO AREAS OUTSIDE OF THIS CONTRACT. ALL SHUT-DOWNS OR TIE-INS RELATING TO THESE SYSTEMS SHALL BE SCHEDULED AND SUBMITTED IN WRITING TO BE APPROVED BY THE OWNER'S FACILITY MANAGEMENT, OWNER, ARCHITECT, OR ENGINEER. CONTRACTOR SHALL SUBMIT IN WRITING A SCHEDULE FOR PHASING OF CONSTRUCTION THAT INDICATES AREAS OF FIRST PRIORITY DURING EACH PHASE AND ANTICIPATED COMPLETION TIMES. SCHEDULES SHALL BE SUBMITTED A MINIMUM OF ONE WEEK PRIOR TO COMMENCING WORK. FACILITY MANAGEMENT, OWNER, ARCHITECT OR ENGINEER SHALL REVIEW THESE SCHEDULES AND NOTIFY CONTRACTOR OF ACCEPTANCE PRIOR TO COMMENCEMENT OF WORK. WHERE NEW WORK IS APPLICABLE TO PATIENT/CLIENT LIVING, USE, OR SUPPORT AREAS; CONTRACTOR SHALL OBTAIN AN APPROVED INFECTION CONTROL PERMIT PRIOR TO INITIATING ACTUAL WORK. PERMIT APPLICATION SHALL BE INITIATED WITH HIS MOBILIZATION SUBMITTAL. (SEE UGCS/SGCS ARTICLE 7.8.)

4. ALL MATERIALS AND LABOR NECESSARY TO COMPLY WITH CODES AND RULES, REGULATIONS AND ORDINANCES SHALL BE PROVIDED. WHERE THE DRAWINGS AND/OR SPECIFICATIONS INDICATE MATERIALS OR CONSTRUCTION IN EXCESS OF CODE REQUIREMENTS, THE DRAWINGS AND/OR SPECIFICATIONS SHALL GOVERN. THE CONTRACTOR SHALL HOLD AND SAVE THE OWNER, ARCHITECT AND ENGINEERS FREE AND HARMLESS FROM LIABILITY OF ANY NATURE OR KIND ARISING FROM HIS FAILURE TO COMPLY WITH ALL APPLICABLE CODES AND ORDINANCES.

5. BIDDERS SHALL VISIT THE SITE AND SHALL BE RESPONSIBLE FOR HAVING ASCERTAINED PERTINENT LOCAL CONDITIONS SUCH AS LOCATION, ACCESSIBILITY AND GENERAL CHARACTER OF THE SITE, THE CHARACTER AND EXTENT OF THE WORK WITHIN THE BUILDING AND TO BECOME FAMILIAR WITH ALL OTHER WORK TO BE PERFORMED AT THIS TIME. NO ADDITIONAL COMPENSATION WILL BE ALLOWED DUE TO CONTRACTOR'S FAILURE TO DETERMINE ALL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. PROSPECTIVE BIDDERS ARE HIGHLY ENCOURAGED TO ATTEND THE SCHEDULED PRE-BID SITE VISIT TO THOROUGHLY FAMILIARIZE THEMSELVES WITH ANY AND ALL EXISTING SITE AND PROJECT LOCATION CONDITIONS WHICH MAY AFFECT THE WORK UNDER THIS CONTRACT. THE OWNER AND ENGINEER WILL NOT BE RESPONSIBLE FOR CONTRACTOR ERRORS OR OMISSIONS WHICH COULD BE MADE REASONABLY KNOWN BY ATTENDING A SCHEDULED SITE VISIT.

6. BEFORE YOU DIG ALL EXISTING UTILITIES, I.E. WATER, SEWER, GAS, FIRE LINE, ELECTRICITY, CABLE, TELEPHONE, IRRIGATION LINES, SHALL BE LOCATED AND CLEARLY MARKED IN ORDER TO AVOID UNNECESSARY SHUT DOWNS AND EMERGENCY.

7. EACH CONTRACTOR SHALL GIVE ALL REQUISITE NOTICES AND FILLED OUT APPLICATIONS, OBTAIN AND PAY FOR ALL PERMITS, DEPOSITS AND FEES (INCLUDING UTILITY CONNECTIONS FEES, ANY UTILITY EXTENSION FEES, TAP FEES, DEVELOPMENT FEES, AND IMPACT FEES) NECESSARY FOR THE INSTALLATION OF WORK UNDER THESE NOTES. TWO (2) COPIES OF CERTIFICATES OF APPROVAL SHALL BE OBTAINED FROM ALL AUTHORITIES ISSUING SAME AND SHALL BE TURNED OVER TO OWNER, ARCHITECT, ENGINEER PRIOR TO FINAL ACCEPTANCE OF THE WORK.

8. REQUIRED INSURANCE SHALL BE PROVIDED BY THIS CONTRACTOR FOR PROTECTION AGAINST PUBLIC LIABILITY AND PROPERTY DAMAGE FOR THE DURATION OF WORK. CONTRACTOR SHALL SECURE AND PAY ALL PERMITS, FEES, INSPECTIONS, AND TESTS UNLESS OTHERWISE INDICATED. COORDINATE WITH ARCHITECT, ENGINEER OR OWNER. SUBSTITUTIONS REQUESTED BY THE CONTRACTOR SHALL BE PAID FOR BY THE CONTRACTOR.

9. ALL WORK SHALL CONFORM WITH FEDERAL, STATE, AND LOCAL CODES, RULES, AND REGULATIONS. ALL WORK SHALL BE PERFORMED BY A LICENSED CONTRACTOR IN A FIRST CLASS WORKMANLIKE MANNER. THE SYSTEMS SHALL BE INSTALLED COMPLETE AND FULLY OPERATIVE UNLESS OTHERWISE INDICATED.

10. ALL WORK IS NEW UNLESS OTHERWISE INDICATED TO BE "EXISTING" OR "REUSED" OR "RELOCATED". CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND PROVIDE A WRITTEN REPORT TO THE ENGINEERING OFFICE. THIS REPORT SHALL DESCRIBE EXISTING DAMAGE OR OTHER CONDITIONS THAT MAY INTERFERE WITH THIS PROPOSED NEW WORK. THIS SITE SURVEY SHALL ALSO INCLUDE VERIFICATION OF SIZES, LOCATIONS, AND CONDITIONS OF EXISTING UTILITIES. QUESTIONS REGARDING THESE DRAWINGS SHALL BE ADDRESSED TO THE ENGINEER PRIOR TO THE AWARDING OF THE CONTRACT. OTHERWISE THE ENGINEER'S INTERPRETATION OF THE MEANING AND INTENT OF THE DRAWINGS SHALL BE FINAL. THE PLANS INDICATE THE EXTENT AND GENERAL REQUIREMENTS OF THE DEMOLITION, ALTERATIONS, RELOCATIONS, AND ADDITIONS. IF ANY DEPARTURES FROM THE DRAWINGS ARE DEEMED NECESSARY BY THE CONTRACTOR, DETAILS OF SUCH DEPARTURES AND THE REASONS THEREFORE SHALL BE SUBMITTED AS SOON AS POSSIBLE TO THE ENGINEER AND OWNER FOR ACTION. NO SUCH DEPARTURES SHALL BE MADE WITHOUT PRIOR APPROVAL OF THE ENGINEER AND OWNER.

11. EXISTING UNDERGROUND UTILITY LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS PRIOR TO EXCAVATION OR TRENCHING.

12. ALL SYSTEMS AND COMPONENTS SHALL BE APPROVED FOR THE PURPOSE FOR WHICH INSTALLED. ALL EQUIPMENT AND MATERIALS SHALL BE NEW AND FROM ESTABLISHED AMERICAN SUPPLIERS UNLESS OTHERWISE INDICATED.

13. ALL EQUIPMENT PARAMETERS SHOWN ARE FOR PERFORMANCE AT SITE ALTITUDE. SUPPLIERS SHALL SELECT AND DEMONSTRATE THAT THEIR EQUIPMENT MEETS THE DESIGN CONDITIONS AT SITE ALTITUDE.

14. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH MECHANICAL/ PLUMBING CONTRACTOR THE MECHANICAL/ PLUMBING EQUIPMENT'S ELECTRICAL REQUIREMENTS, INCLUDING POWER, CONTROL, COMMUNICATION, AND MONITORING, OF EACH DEVICE PROVIDED AND/OR INSTALLED BY MECHANICAL/PLUMBING CONTRACTOR.

15. SUPPORT SYSTEM FOR EQUIPMENT SUPPORTED BY THE BUILDING STRUCTURE SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER VIA ARCHITECT FOR APPROVAL PRIOR TO PURCHASE AND INSTALLATION. NO WIRE OR PERFORATED STRAP WILL BE PERMITTED FOR ANY HANGER OR SUPPORT.

16. THE CONTRACTOR SHALL NOT SCALE THE CONTRACT DOCUMENTS. THE CONTRACT DOCUMENTS ARE DIAGRAMMATIC IN NATURE AND DO NOT COMPLETELY DEPICT ALL EXISTING CONDITIONS IN THE AREA.

17. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOOK THROUGH ALL DRAWINGS ASSOCIATED WITH THIS PROJECT. WORK ASSOCIATED WITH THE ELECTRICAL CONTRACTOR'S TRADE MAY BE SHOWN ON OTHER DRAWINGS. ANY ADDITIONAL COSTS RESULTING FROM THE FAILURE TO INCLUDE THESE ITEMS SHOWN ON OTHER DRAWINGS WILL BE INCURRED BY THE CONTRACTOR. SHOULD THE CONTRACTOR ENCOUNTER ANY DISCREPANCIES OR INCONSISTENCIES IN THE CONSTRUCTION DOCUMENTS, THE MORE STRINGENT SHALL GOVERN. CONTRACTOR SHALL FIELD VERIFY BY MEASUREMENT EXACT LOCATIONS DEPICTED AND ALL DIMENSIONS.

18. CONTRACTOR SHALL FIELD VERIFY CONDITION OF EXISTING EQUIPMENT AND PROVIDE NECESSARY COMPONENTS TO ASSEMBLE AND TO START-UP COMPLETE AND FULLY OPERATIONAL SYSTEMS. WHEREVER THE WORD(S) "PROVIDE", "FURNISH", "INSTALL" AND/OR THE LIKE IS/ARE USED; IT IS TO BE DEFINED AS AND UNDERSTOOD TO REQUIRE THAT THE CONTRACTOR SHALL PROVIDE THE ITEM/SYSTEM(S) TOTALLY AND COMPLETELY FURNISHED, INSTALLED, AND FULLY OPERABLE AND USEABLE FOR ITS/THEIR INTENDED PURPOSE(S) UNLESS SPECIFICALLY NOTED OTHERWISE IN THE CONTRACT DOCUMENTS. EVERY EFFORT HAS BEEN MADE TO CLEARLY AND FULLY DEPICT ALL KNOWN EXISTING CONDITIONS AND ITEMS REQUIRING REMOVAL, RELOCATION, DEMOLITION AND/OR ALTERATION. DUE TO THE SMALL SCALE OF THE DRAWINGS AND THE NATURE OF RENOVATION AND REHAB WORK, CERTAIN ITEMS SUCH AS THOSE CONCEALED BEHIND EQUIPMENT, FINISHES, OR STRUCTURAL MEMBERS AND THE LIKE; OR THOSE NOT ACCESSIBLE FOR INSPECTION OR IDENTIFIABLE AS ABANDONED OR TO BE ABANDONED WITHOUT DESTRUCTION; MAY NOT BE SPECIFICALLY AND/OR SEPARATELY DEFINED OR SHOWN. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED REMOVAL, RELOCATION, DEMOLITION, AND/OR ALTERATION OF SUCH ITEMS REASONABLY INHERENT WITH SUCH RENOVATION AND REHABILITATION WORK AT NO ADDITIONAL COST TO THE OWNER IN ACCORDANCE WITH THE BEST COMMERCIAL PRACTICES AND THESE CONTRACT DOCUMENTS TO PROVIDE A COMPLETE AND USEABLE FACILITY WITHIN THE SCOPE OF THE WORK TO BE PERFORMED. NO CONSIDERATION SHALL BE GIVEN TO THE NATURE OF THE MATERIALS, AND ALL DEMOLITION SHALL BE DESIGNATED AS UNCLASSIFIED DEMOLITION. DEMOLITION OF EVERY DESCRIPTION AND OF WHATEVER SUBSTANCES ENCOUNTERED SHALL BE PERFORMED TO THE DEGREE REQUIRED FOR THE INSTALLATION OF THE ITEMS/FINISHES REQUIRED HEREIN OR AS SPECIFIED.

19. PROVIDE INSTALLATIONS INSTRUCTIONS, PRODUCT DATA SUBMITTAL INFORMATION, WARRANTIES, CONTACT INFORMATION DURING WARRANTY PERIOD PER SPECIFICATION.

20. FOR OUTDOOR EQUIPMENT ON GRADE AND INDOOR FLOOR MOUNTED EQUIPMENT, THE CONTRACTOR SHALL CONSTRUCT LEVEL 3000 PSI CONCRETE(28 DAY COMPRESSIVE STRENGTH) SLABS WITH FINISHED EDGES, WIRE REINFORCED MINIMUM 6X6 W1.4/1.4 OR HEAVIER PER ASTM A185, MINIMUM 3 1/2" THICK, AND MINIMUM 6" LARGER ON ALL SIDES THAN THE EQUIPMENT BEING SUPPORTED. THE PAD SHALL BE HAVE 2 COATS OF EPOXY SEALANT TO SEAL THE PAD.

21. CONTRACTOR SHALL MAKE NO PENETRATIONS WHATSOEVER OF WALLS FORMING PART OF A STAIRWELL, AN EXIT PASSAGEWAY, OR OTHER TWO-HOUR RATED WALLS. ALL CONDUITS SHALL RUN PARALLEL TO WALLS.

22. CONTRACTOR SHALL SAW CUT AND PATCH ASPHALT, CONCRETE OR OTHER MATERIAL ENCOUNTERED AS REQUIRED TO INSTALL NEW UNDERGROUND RACEWAY. REFER TO ARCHITECTURAL SPECIFICATIONS REGARDING PATCHING REQUIREMENTS.

23. CONTRACTOR SHALL PROVIDE AND INSTALL IDENTIFICATION TAGS FOR EQUIPMENT AND CONDUITS PER ASME 13.1 SCHEME OF IDENTIFICATION FOR PIPING. BURIED ELECTRICAL CONDUITS SHALL BE MARKED PER CODE REQUIREMENTS WITH UNDERGROUND WARNING TAPE 3" BELOW FINISHED GRADE. TAPE SHALL BE 4" WIDE COLORED RED WITH SUITABLE WARNING LEGEND PER ASME A13.1 SCHEME OF IDENTIFICATION FOR PIPING.

24. CONTRACTOR SHALL TAKE PRECAUTIONS PER THE ARCHITECT'S INSTRUCTIONS TO PROTECT EXISTING TREES AND /OR OTHER SITE VEGETATION.

25. ALL ELECTRICAL CONDUIT AND BOX OPENINGS SHALL BE CAPPED DURING DEMOLITION AND CONSTRUCTION.

26. SITE VISIT REPORTS
    DURING THE COURSE OF THE JOB, THE ENGINEER WILL MAKE SITE VISITS TO OBSERVE WORK IN PROGRESS AND WILL SUBSEQUENTLY PREPARE A WRITTEN SITE VISIT REPORT, WHICH WILL BE SENT TO THE CONTRACTOR AND TO WHOMEVER ELSE THE ENGINEER DESIRES. THE CONTRACTOR SHALL PREPARE A WRITTEN AND TYPED RESPONSE IN THE NEXT WEEKLY LOG REPORT AND SHALL INCLUDE:
    A. DATE OF SITE VISIT BY THE ENGINEER,
    B. DATE OF RECEIPT OF THE SITE VISIT REPORT,
    C. NAME AND TITLE OF THE PREPARER OF THE RESPONSE,
    D. AN ITEM NUMBER REFERENCED TO THE SITE REPORT,
    E. A BRIEF THREE OR FOUR WORD DESCRIPTION OF THE ITEM,
    F. THE CONTRACTOR OR SUBCONTRACTOR AFFECTED,
    G. THE PROPOSED COURSE OF ACTION, AND
    H. AN EXPECTED TIME OF COMPLETION OF THE ACTION.

27. ALL ELECTRICAL CONDUIT AND PANEL OPENINGS SHALL BE CAPPED DURING DEMOLITION AND CONSTRUCTION.

28. SUBSTITUTED PRODUCTS
    A. MATERIAL OR EQUIPMENT SPECIFIED BY MANUFACTURER'S NAME IS BEING USED AS A BASIS OF STANDARD. NO SUBSTITUTION IS ALLOWABLE WITHOUT ENGINEER'S WRITTEN APPROVAL FOURTEEN (14) DAYS PRIOR TO BID DUE DATE UNLESS THE MANUFACTURER IS LISTED ON THE DRAWINGS OR IN THE SPECIFICATION AS BEING A PREAPPROVED ALTERNATIVE MANUFACTURER. ANY SUBMITTAL RECEIVED WITHOUT SUCH WRITTEN APPROVAL OR PRIOR APPROVAL IS SUBJECT TO UNQUALIFIED REJECTION.
    B. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THAT SUBMITTED SUBSTITUTE EQUIPMENT WILL FIT IN SPACE AVAILABLE. THE CONTRACTOR'S SUBMITTAL FOR ACCEPTANCE OF THE SUBSTITUTE SHALL INCLUDE A WRITTEN STATEMENT OF WHETHER OR NOT SUCH ACCEPTANCE WOULD REQUIRE ANY SUBSEQUENT OR ASSOCIATED CHANGES TO THE DRAWINGS OR SPECIFICATIONS. ANY SUCH CHANGES SHALL BE DESCRIBED IN WRITING, BRIEFLY BUT COMPLETE.
    C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COSTS OF ANY SUCH MODIFICATIONS DUE TO SUBSTITUTION OF MATERIALS OR EQUIPMENT FOR THAT WHICH WAS SPECIFIED OR SCHEDULED. THE COST SHALL BE COMPLETE, THAT IS, IT SHALL INCLUDE THE COST EFFECT OF ANY AND ALL OTHER TRADES.
    D. THE ENGINEER MAY REQUEST DETAILED SHOP DRAWING OR PLAN LAYOUTS OF MECHANICAL ROOMS OR SYSTEMS OF THE SUBSTITUTED EQUIPMENT.
    E. SHOULD A SUBSTITUTION BE APPROVED BY THE ENGINEER (BASED UPON THE SUBSTITUTION SUBMITTAL REVIEW) AND ACCEPTED, AND SHOULD THE SUBSTITUTE MATERIAL OR EQUIPMENT PROVE DEFECTIVE, NOT MEETING DESIGN PARAMETERS, OR OTHERWISE UNSATISFACTORY FOR THE SERVICE INTENDED WITHIN THE GUARANTEE PERIOD, THIS MATERIAL OR EQUIPMENT SHALL BE REPLACED WITH THE MATERIAL OR EQUIPMENT SPECIFIED AT NO ADDITIONAL COST TO THE OWNER.

ELECTRICAL:

29. ALL EXPOSED CONDUIT SHALL BE PAINTED TO MATCH ADJACENT SURFACES.

30. PROVIDE BLANK METAL COVERPLATES OVER ALL UNUSED OUTLET BOXES. PAINT COVERPLATE TO MATCH ADJACENT SURFACES.

31. RECEPTACLE AND DATA OUTLET MOUNTING HEIGHTS INDICATED ON THE DRAWINGS ARE APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH OTHER TRADES FOR EXACT HEIGHT REQUIRED. THIS REQUIREMENT ALSO APPLIES TO SWITCHES, TELEPHONE OUTLETS, DATA OUTLETS, HVAC SENSORS, ETC.. ANY DEVICE THAT HAS TO BE RELOCATED DUE TO CONTRACTOR'S FAILURE TO COORDINATE LOCATION WITH COUNTERTOPS, CHALKBOARDS, TACKBOARDS, ETC. WILL BE DONE AT NO ADDITIONAL COST TO THE OWNER.

32. ALL RECEPTACLES TO BE 20A SPECIFICATION GRADE, IVORY. WALL PLATES TO MATCH. ISOLATED GROUND DUPLEX RECEPTACLES (IG) WILL BE ORANGE BODY AND FACE PLATE. EXTERIOR RECEPTACLES SHALL BE WEATHERPROOF GFCI AND SHALL HAVE WHILE IN USE METAL WEATHERPROOF COVERS.

33. COORDINATE WORK WITH ALL OTHER TRADES GIVING SPECIAL CONSIDERATION TO WORK DONE ABOVE CEILINGS, OUTLET LOCATIONS AT MILLWORK, AND SWITCH LOCATIONS IN REGARDS TO DOOR SWINGS.

34. WIRING SHALL BE THWN COPPER WITH MINIMUM SIZE OF #12, IN MINIMUM 3/4" (EMT) CONDUIT WITH CU. EGC., UNLESS NOTED OTHERWISE.

35. INSTALL WALL MOUNTED LIGHT FIXTURES, SWITCHES, OUTLETS, AND COMMUNICATION DEVICES IN STRICT COORDINATION WITH ARCHITECTURAL DETAILS, SECTIONS AND ELEVATIONS, AND ADA REQUIREMENTS.

36. FIRESTOPPING OF PENETRATIONS IN FIRE-RATED WALLS, FLOORS, ETC. SHALL BE DONE BY A FIRESTOPPING CONTRACTOR. ELECTRICAL CONTRACTOR SHALL MAKE REQUIRED PENETRATIONS IN RATED WALL, FLOORS, ETC. NEATLY AND WITH A CUTTING TOOL, THE CONTRACTOR SHALL MAKE THE PENETRATIONS NO LARGER THAN NECESSARY, AND THE CONTRACTOR SHALL COORDINATE ALL SUCH PENETRATIONS WITH THE FIRESTOPPING CONTRACTOR BEFORE SUCH PENETRATIONS ARE MADE.

37. REFER TO SPECIFICATIONS FOR ALL COMMUNICATION SYSTEM REQUIREMENTS. (IN LIEU OF SPECS: PROVIDE 3/4" C. W/ PULLCORD FROM COMMUNICATION OUTLETS TO 6" ABOVE LAY-IN CEILING.)

38. SUPPORT ALL FIXTURES FROM STRUCTURE ABOVE CEILING TILES OR PLASTER. CEILING SHALL NOT SUPPORT FIXTURES.

39. FINISHED FLOOR ELEVATIONS FOR OUTLETS AND OTHER DEVICES ARE TO CENTER OF BOX. WHERE MILLWORK IS PRESENT, BOTTOM OF BOX SHALL BE MINIMUM OF 2" ABOVE BACK-SPLASH, REGARDLESS OF DIMENSION SHOWN ON DRAWINGS.

40. USE COMPRESSION FITTINGS ON METALLIC CONDUIT.

41. BEFORE INSTALLATION, EQUIPMENT AND DEVICES INCLUDING, BUT NOT LIMITED TO, ANY DEVICE WITH ELECTRICAL CONNECTIONS, DUCTWORK, INSULATION, PIPING, VALVES, AIR DEVICES, ETC., SHALL NOT BE STORED DIRECTLY ON GRADE OR ON A SLAB OR FLOOR. BEFORE AND AFTER INSTALLATION, SUCH EQUIPMENT AND DEVICES SHALL BE PROTECTED FROM ENTRY OF DIRT, TRASH, WATER (EXCEPT AS REQUIRED), VERMIN, ETC.

42. DEVICES THAT MIGHT CAUSE OR OPERATE WITH VIBRATION OR NOISE SHALL BE ISOLATED PER MANUFACTURER'S RECOMMENDATIONS AND/OR PER SPECIFICATIONS.

43. SWITCHBOARDS, PANEL BOARDS AND TRANSFORMERS SHALL BE CUTLER-HAMMER, SQUARE-D, OR SIMILAR APPROVED BY THE ENGINEER.

44. USE THE FOLLOWING WIRING COLOR CODE:
    A. FOR WIRE SIZES 10 AWG AND SMALLER, INSTALL WIRE COLORS IN ACCORDANCE WITH THE FOLLOWING:
       1. BLACK AND RED FOR SINGLE PHASE CIRCUITS AT120/240 VOLTS.
       2. BLACK, RED, AND BLUE FOR CIRCUITS AT 120/208 VOLTS SINGLE OR THREE PHASE.
       3. ORANGE, BROWN, AND YELLOW FOR CIRCUITS AT 277/480 VOLTS SINGLE OR THREE PHASE.
    B. FOR WIRE SIZES 8 AWG AND LARGER, IDENTIFY WIRE WITH COLORED TAPE AT TERMINALS, SPLICES AND BOXES. COLORS ARE AS FOLLOWS:
       1. BLACK AND RED FOR SINGLE PHASE CIRCUITS AT 120/240 VOLTS.
       2. BLACK, RED, AND BLUE FOR CIRCUITS AT 120/208 VOLTS SINGLE OR THREE PHASE.
       3. BROWN, ORANGE, AND YELLOW FOR CIRCUITS AT 277/480 VOLTS SINGLE OR THREE PHASE.
    C. NEUTRAL CONDUCTORS: WHITE FOR 208/120V CIRCUITS. GREY FOR 480/277V CIRCUITS.
    D. BRANCH CIRCUIT CONDUCTORS: INSTALL THREE OR FOUR WIRE HOMERUNS WITH EACH PHASE UNIQUELY COLOR CODED.
    E. FEEDER CIRCUIT CONDUCTORS: UNIQUELY COLOR CODE EACH PHASE.
    F. GROUND CONDUCTORS:
       1. FOR 6 AWG AND SMALLER: GREEN.
       2. FOR 4 AWG AND LARGER: IDENTIFY WITH GREEN TAPE AT BOTH ENDS AND VISIBLE POINTS INCLUDING JUNCTION BOXES.

45. EACH 120 VOLT BRANCH CIRCUIT SHALL BE PROVIDED WITH A SEPARATE NEUTRAL, ONE FOR EACH PHASE WIRE. CIRCUIT BREAKER HANDLE TIES MAY BE USED INSTEAD OF SEPARATE NEUTRALS. COMPLY WITH ALL CODES.

46. PROVIDE ARC-FLASH LABELING ON ALL ELECTRICAL PANELS, BOTH NEW AND EXISTING. ALL LABELING SHALL BE DONE USING ANNEX H OF NFPA 70E, OR BY CALCULATIONS.

47. ALL STEP-DOWN TRANSFORMERS SHALL COMPLY WITH THE U.S. DOE 2016 LEGISLATION FOR ENERGY EFFICIENCY.

48. PROVIDE AN UN-SWITCHED PHASE WIRE FROM THE LINE SIDE OF THE ROOM'S LIGHT SWITCH TO THE EMERGENCY FIXTURE IN THAT ROOM.

49. MC CABLE MAY BE USED FOR BRANCH CIRCUITS WHERE ALLOWED BY CODE.

SYMBOL LEGEND

SYMBOL	DESCRIPTION
—X——X—	FENCE
S	F.A. COMBO WITH AUTOMATIC SMOKE DETECTOR AND CARBON MONOXIDE SENSOR. ZONE NUMBER AS INDICATED.
T	TRANSFORMER.
J	JUNCTION.
EB	ELECTRIC BOX.
	ELECTRIC METER.
	LIGHT POLE.
	POWER POLE.
	SERVICE POLE WITH LIGHT.
T	ELECTRIC POLE WITH TRANSFORMER.
	GUY WIRE.
	SPECIAL CABINET AS NOTED.
	PANELBOARD. SEE PANEL SCHEDULE
	SAFETY SWITCH, PROVIDED AND INSTALLED UNDER DIV. 16. TO HAVE POLES AND RATING REQUIRED. TO BE MOUNTED IN NEMA 3R IF INSTALLED OUTDOORS.
-EUG-	ELECTRICAL UNDERGROUND CIRCUIT, 2'-0" MINIMUM BELOW GRADE.
—SEUG—	SECONDARY SERVICE ELECTRICAL UNDERGROUND CIRCUIT, 2'-0" MINIMUM BELOW GRADE.
-EOH-	ELECTRICAL OVERHEAD SERVICE.
—PEOH—	PRIMARY ELECTRICAL OVERHEAD SERVICE.
—SEOH—	SECONDARY ELECTRICAL OVERHEAD SERVICE.
	BRANCH CIRCUIT IN WALLS OR CEILING.
X-X #2TT	HOME RUN TO PANEL WITH BRANCH CIRCUIT NUMBERS INDICATED. TIC MARKS REPRESENT NEUTRAL, HOT, SWITCH LEG, AND GROUND CONDUCTORS RESPECTIVELY. CONDUITS WITH NO TIC MARKS SHALL BE: "A HOT AND NEUTRAL", "A HOT AND SWITCH LEG", "A NEUTRAL AND SWITCH LEG", OR "HOT, NEUTRAL, AND GROUND OR ISOLATED GROUND", AS APPLICABLE.

NOTE: SOME SYMBOLS SHOWN MAY NOT BE USED ON THIS PROJECT.

NO ENERGY CODE REQUIRED
NO LIGHTING CHANGES

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STATE OF TEXAS
ROBERT J. BLANCHETTE
120820
REGISTERED PROFESSIONAL ENGINEER

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CONSTRUCTION DOCUMENTS AUGUST 13, 2018

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EMC PROJECT #1710052

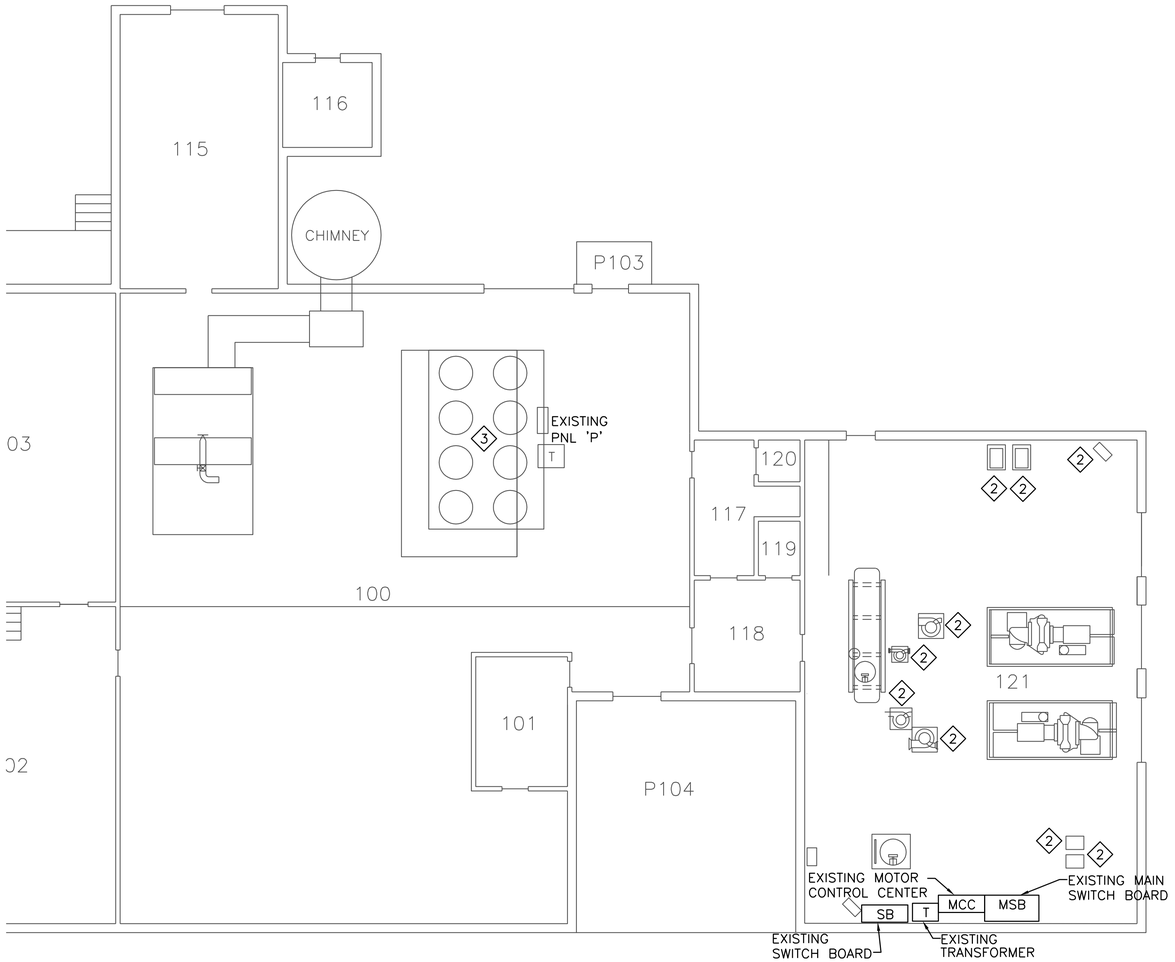
Rev.#	Date	Initials	Revision Description:

Designed By: EMC
Drawn By: EMC
Checked By: EMC
Scale: AS SHOWN

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)
Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN

Sheet E-100
ELECTRICAL GENERAL NOTES, LEGEND AND ENERGY CODE
1 of: 9



N PLAN 1 E-200

ELECTRICAL - BUILDING 550 DEMOLITION FLOOR PLAN

SCALE: 1/8" = 1'-0"

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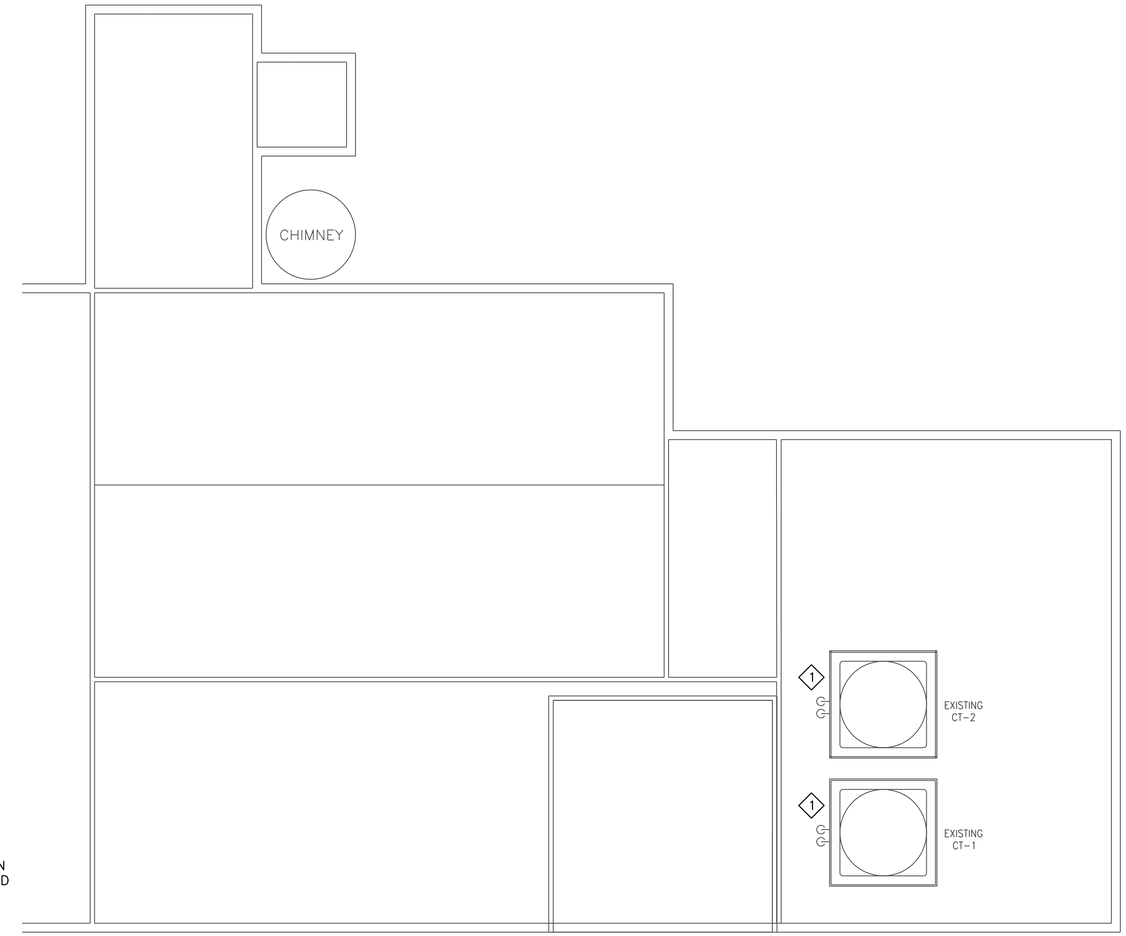


N PLAN 2 E-200

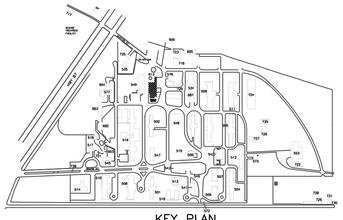
ELECTRICAL - BUILDING 550 DEMOLITION ROOF PLAN

SCALE: 1/8" = 1'-0"

8 6 4 2 0 4 8 12 16

ELECTRICAL DEMOLITION KEYED NOTES:

1. REMOVE DISCONNECTS, JUNCTION BOXES AND CONDUCTORS ON ROOF, CUT AND CAP CONDUIT ABOVE ROOF.
2. DISCONNECT WIRING FROM PUMP. REMOVE DISCONNECTS. PREPARE CIRCUIT FOR RECONNECTION TO NEW EQUIPMENT.
3. DISCONNECT WIRING FROM BOILERS. REMOVE DISCONNECTS. PREPARE CIRCUIT FOR RECONNECTION TO NEW EQUIPMENT.



KEY PLAN

STATE OF TEXAS
ROBERT J. BLANCHETTE
120820
REGISTERED PROFESSIONAL ENGINEER
04/30/18

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Designed By: EMC
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EMC ENGINEERS

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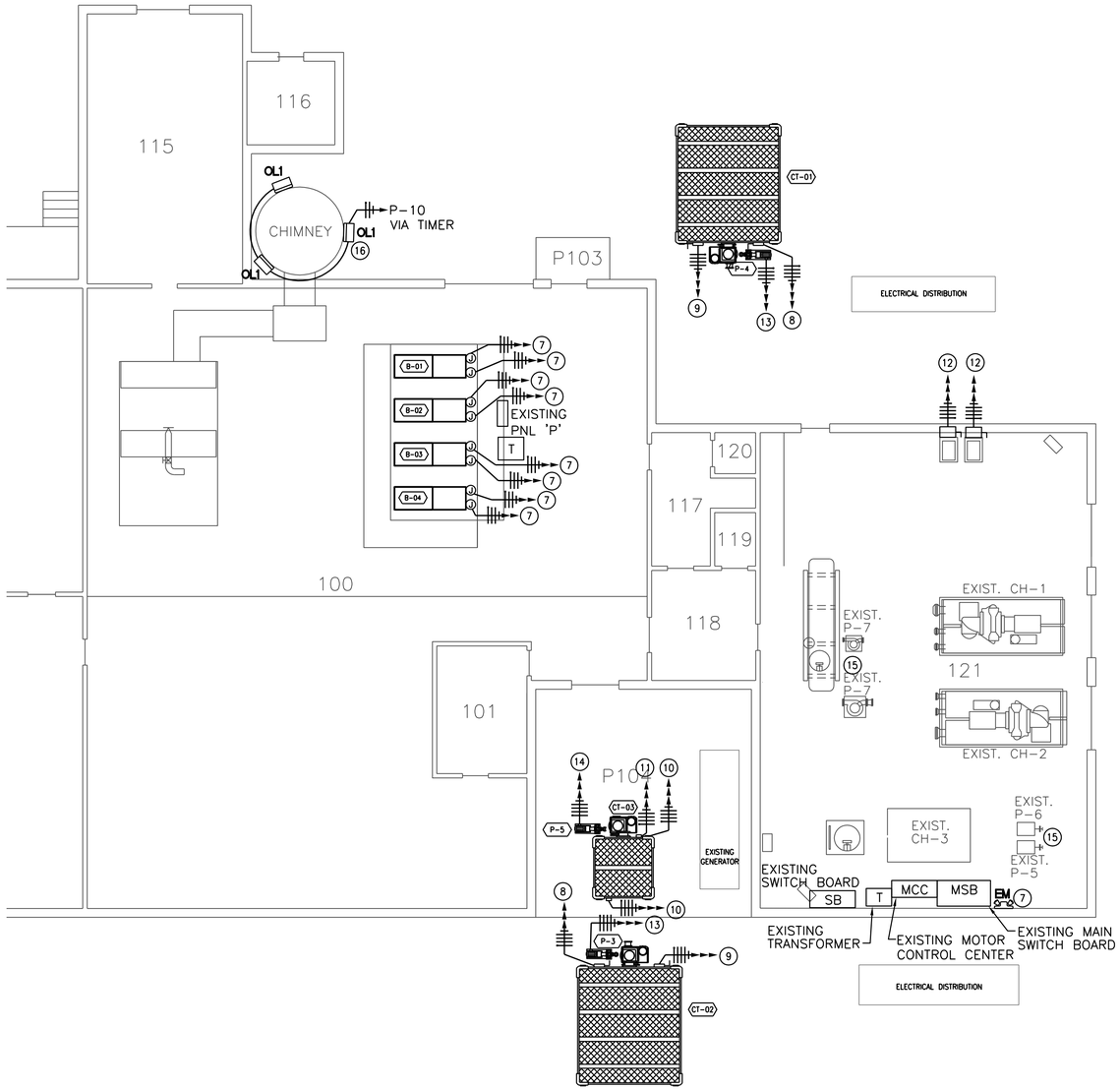
Sheet
E-200
DEMOLITION
BUILDING 550 FLOOR AND ROOF PLANS



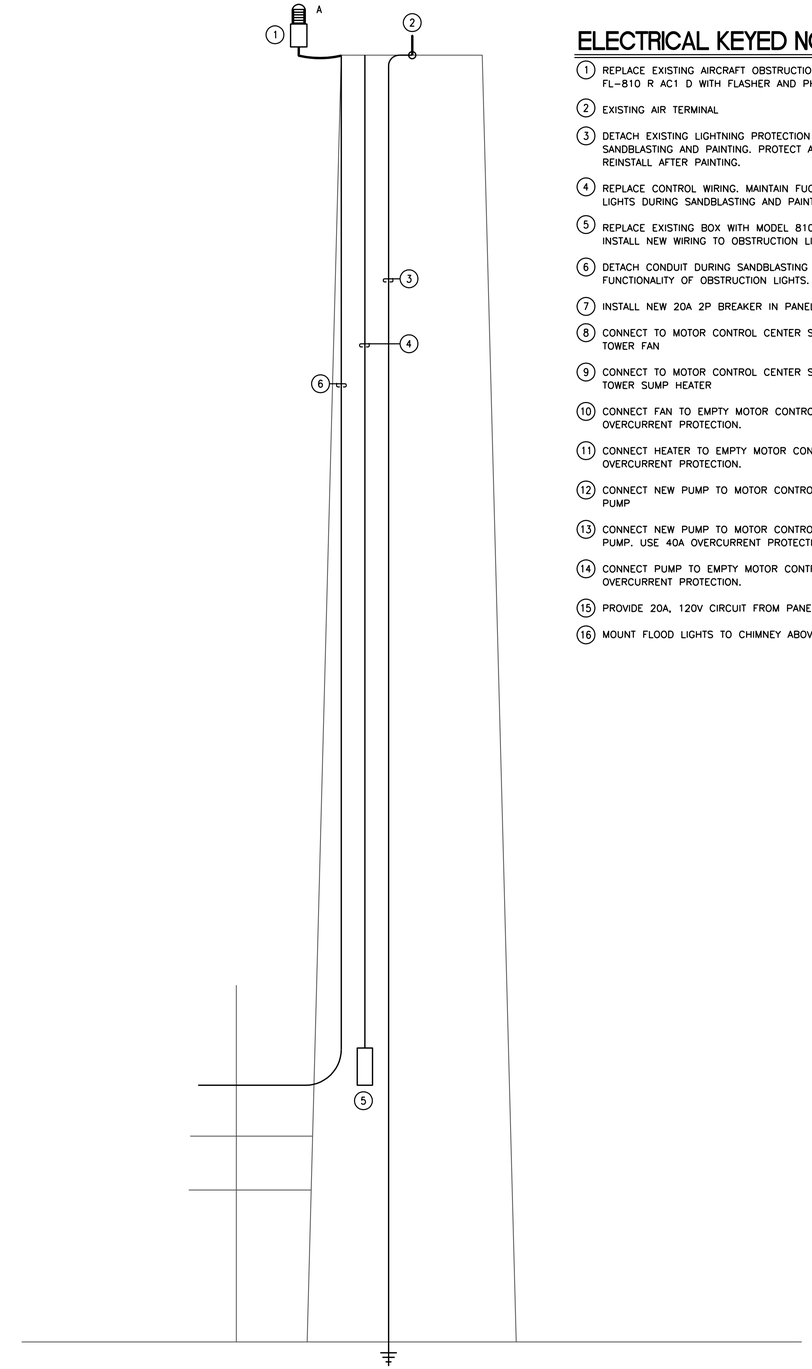
PLAN

1 / E-300

ELECTRICAL - BUILDING 550 UPGRADE PLAN

SCALE: 1/8" = 1'-0"

8 6 4 2 0 4 8 12 16



2 / E-300

ELECTRICAL - CHIMNEY UPGRADE ELEVATION

SCALE: NONE

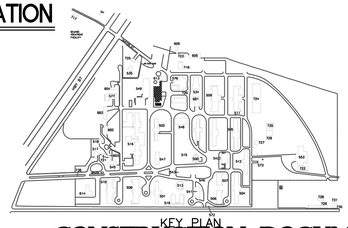
ELECTRICAL KEYED NOTES:

1. REPLACE EXISTING AIRCRAFT OBSTRUCTION LIGHT WITH FLIGHT LIGHT FL-810 R AC1 D WITH FLASHER AND PHOTOCELL
2. EXISTING AIR TERMINAL
3. DETACH EXISTING LIGHTNING PROTECTION GROUND CONDUCTOR FOR SANDBLASTING AND PAINTING. PROTECT AND SUPPORT WHILE DETACHED. REINSTALL AFTER PAINTING.
4. REPLACE CONTROL WIRING. MAINTAIN FUCNTIONALITY OF OBSTRUCTION LIGHTS DURING SANDBLASTING AND PAINTING.
5. REPLACE EXISTING BOX WITH MODEL 81010 LAMP ALARM/TRANSFER RELAY. INSTALL NEW WIRING TO OBSTRUCTION LIGHTS.
6. DETACH CONDUIT DURING SANDBLASTING AND PAINTING. MAINTAIN FUNCTIONALITY OF OBSTRUCTION LIGHTS.
7. INSTALL NEW 20A 2P BREAKER IN PANEL P. CONNECT TO BREAKER.
8. CONNECT TO MOTOR CONTROL CENTER SPACE USED FOR OLD COOLING TOWER FAN
9. CONNECT TO MOTOR CONTROL CENTER SPACE USED FOR OLD COOLING TOWER SUMP HEATER
10. CONNECT FAN TO EMPTY MOTOR CONTROL CENTER SPACE WITH 15A OVERCURRENT PROTECTION.
11. CONNECT HEATER TO EMPTY MOTOR CONTROL CENTER SPACE WITH 20A OVERCURRENT PROTECTION.
12. CONNECT NEW PUMP TO MOTOR CONTROL CENTER SPACE USED BY OLD PUMP
13. CONNECT NEW PUMP TO MOTOR CONTROL CENTER SPACE USED BY OLD PUMP. USE 40A OVERCURRENT PROTECTION.
14. CONNECT PUMP TO EMPTY MOTOR CONTROL CENTER SPACE WITH 20A OVERCURRENT PROTECTION.
15. PROVIDE 20A, 120V CIRCUIT FROM PANEL P FOR CONTROL VALVES.
16. MOUNT FLOOD LIGHTS TO CHIMNEY ABOVE ROOF LINE OF BUILDING.

LIGHTING FIXTURE SCHEDULE

SYMBOL	MANUFACTURER NAME AND NUMBER	LAMPS	VOLTAGE	BALLAST	MOUNTING	DESCRIPTION	NOTES
CHIMNEY FAA OBSTRUCTION LIGHTING							
A	FLIGHT LIGHT, INC FL-810-R-AC1-D-F-P	116W	120V	N/A	SWING ARM	FLASHER LIGHR 2500W 30 FPM, AND PHOTOCELL AND MODEL 81010 LAMP ALARM/TRANSFER RELAY	
CHIMNEY UP LIGHTING							
OL1	COOPER LIGHTING VFS-K-B40-7-LED-E1-VAT-BZ	94W LED	120V	N/A	BRACKET	DIE-CAST UP LIGHT	
EMERGENCY LIGHTING							
EM	COOPER LIGHTING APLEL	1.5W LED	MVOLT	NA	WALL MOUNTED	LED EMERGENCY LIGHT WITH BATTERY BACKUP	
OL1E	LUMARK XTOR6B-W-BZ-CBP	58W LED	UNV	NA	WALL	LED EMERGENCY WALL PACK WITH BATTERY BACKUP	

NOTES
1. LIGHT FIXTURES SHALL BE AS SPECIFIED AND NO SUBSTITUTIONS WILL BE ALLOWED UNLESS PRIOR APPROVED PER SPECIFICATIONS.
2. REFER TO PLAN FOR TYPES AND QUANTITIES USED.



KEY PLAN

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ROBERT J. BLANCHETTE
120820
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PROFESSIONAL ENGINEER

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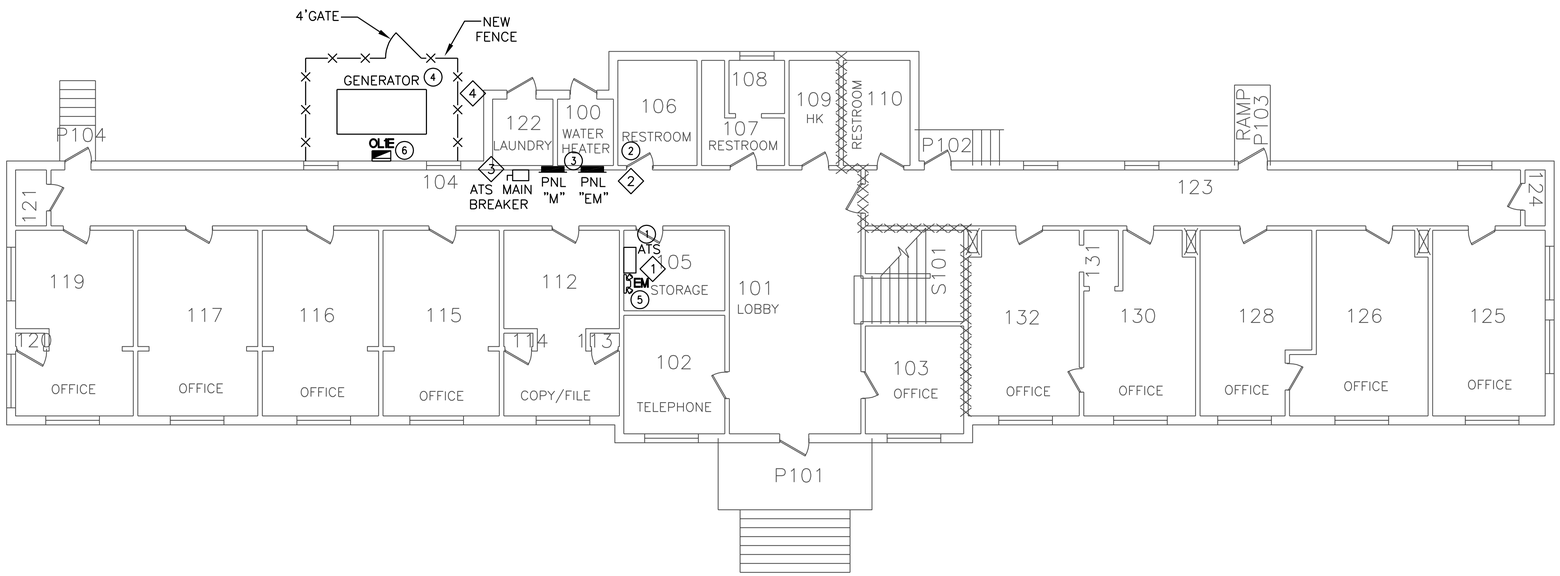
TEXAS FIRM REG. #F2491
EMC PROJECT #1710052

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)

Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN

Sheet
E-300
BUILDING 550 FLOOR AND ROOF UPGRADE PLANS



ELECTRICAL - BUILDING 503
GENERATOR REPLACEMENT DEMOLITION AND UPGRADE PLANS

N
PLAN

1
E-400

SCALE: 1/8" = 1'-0"

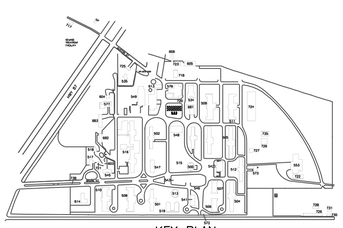
8 6 4 2 0 4 8 12 16

ELECTRICAL DEMOLITION KEYED NOTES:

1. REMOVE AUTOMATIC TRANSFER SWITCH. REMOVE CONDUCTORS AND CONDUIT TO EMERGENCY PANEL, AND ATS MAIN BREAKER.
2. REMOVE EMERGENCY PANEL. PREPARE DISCONNECTED CIRCUITS TO BE RECONNECTED TO NEW PANEL.
3. REMOVE ATS MAIN BREAKER AND CONDUCTORS AND CONDUIT BACK TO GENERATOR.
4. REMOVE GENERATOR, FUEL TANK AND FENCE. RETAIN SIGN FOR REUSE. DEMOLISH EXISTING PAD.

ELECTRICAL REMODEL KEYED NOTES:

1. INSTALL NEW AUTOMATIC TRANSFER SWITCH PER SCHEDULE. ATS SHALL BE FROM SAME MANUFACTURER AS GENERATOR.
2. INSTALL NEW EMERGENCY PANEL PER RISER AND SCHEDULE. RECONNECT CIRCUITS FROM OLD EMERGENCY PANEL.
3. FEED NEW EMERGENCY PANEL WITH EXISTING BREAKER AND CONDUCTORS FROM PANEL M. CONNECT PHASES A AND B OF NEW PANEL. CONTRACTOR TO INSPECT PANEL 'M' FOR CODE COMPLIANCE AND MAKE ANY REPAIRS REQUIRED.
4. INSTALL NEW PAD AND GENERATOR PER SCHEDULE. INSTALL NEW FENCE TO ENCLOSE AN AREA OF 15' X 8'. EXTEND GENERATOR EXHAUST TO ABOVE AWNING HEIGHT.
5. INSTALL NEW EMERGENCY LIGHT POSITIONED TO ILLUMINATE ATS. CONNECT TO UNSWITCHED LEG OF LIGHTING CIRCUIT IN ROOM.
6. INSTALL NEW EMERGENCY LIGHT POSITIONED TO ILLUMINATE GENERATOR. CONNECT TO EXISTING EXTERIOR LIGHTING CIRCUIT.



STATE OF TEXAS
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PROFESSIONAL ENGINEER

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EMC PROJECT #1710052

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Scale: AS SHOWN

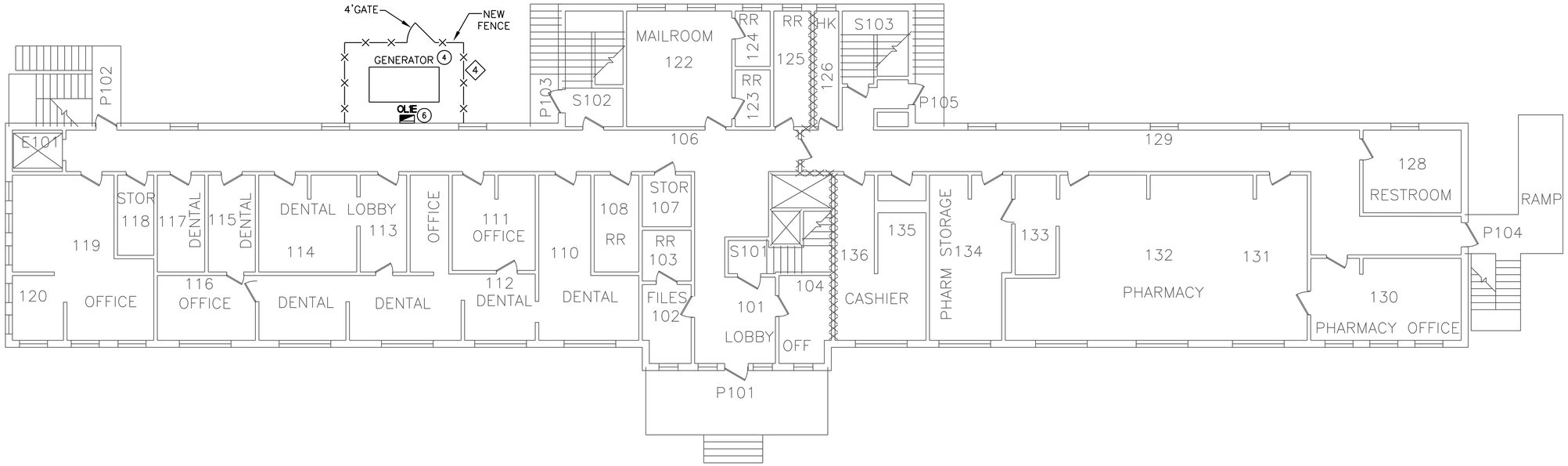
EMC ENGINEERS

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)

Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN

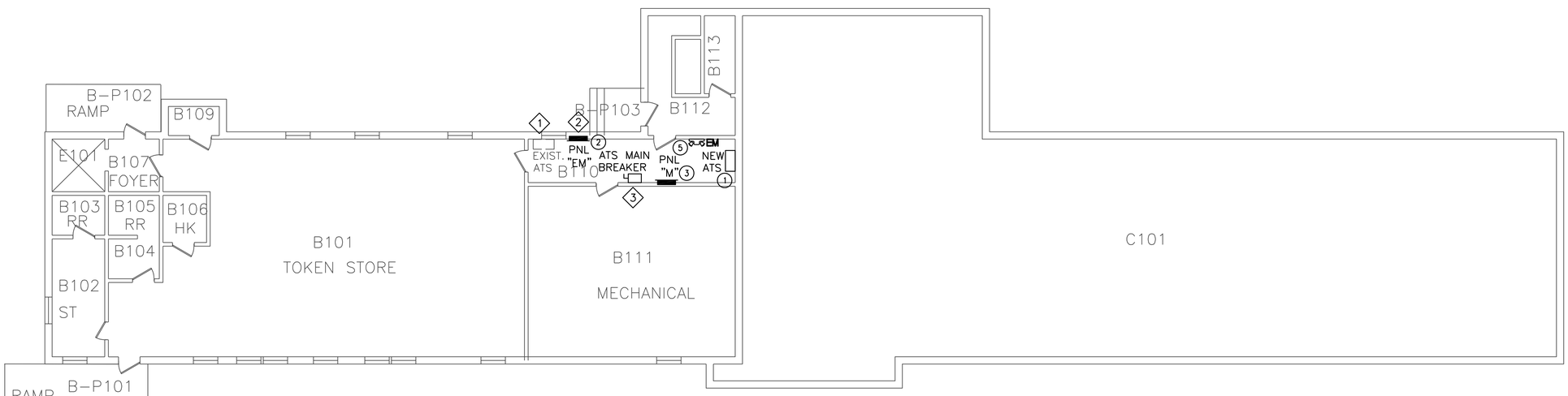
Sheet
E-400
BUILDING 503 GENERATOR REPLACEMENT DEMOLITION AND UPGRADE PLANS



ELECTRICAL - BUILDING 514 - FIRST FLOOR
GENERATOR REPLACEMENT DEMOLITION AND UPGRADE PLANS

N PLAN 1 E-401 SCALE: 1/8" = 1'-0"

8 6 4 2 0 4 8 12 16



ELECTRICAL - BUILDING 514 - BASEMENT
GENERATOR REPLACEMENT DEMOLITION AND UPGRADE PLANS

N PLAN 2 E-401 SCALE: 1/8" = 1'-0"

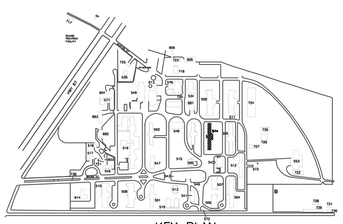
8 6 4 2 0 4 8 12 16

ELECTRICAL DEMOLITION KEYED NOTES:

1. REMOVE AUTOMATIC TRANSFER SWITCH. REMOVE CONDUCTORS AND CONDUIT TO EMERGENCY PANEL, MAIN PANEL, AND ATS MAIN BREAKER.
2. REMOVE EMERGENCY PANEL. PREPARE DISCONNECTED CIRCUITS TO BE RECONNECTED TO NEW PANEL.
3. REMOVE ATS MAIN BREAKER AND CONDUCTORS AND CONDUIT BACK TO GENERATOR.
4. REMOVE GENERATOR, FUEL TANK AND FENCE. RETAIN SIGN FOR REUSE. DEMOLISH EXISTING PAD.

ELECTRICAL REMODEL KEYED NOTES:

1. INSTALL NEW AUTOMATIC TRANSFER SWITCH PER SCHEDULE. ATS SHALL BE FROM SAME MANUFACTURER AS GENERATOR.
2. INSTALL NEW EMERGENCY PANEL PER RISER AND SCHEDULE. RECONNECT CIRCUITS FROM OLD EMERGENCY PANEL.
3. FEED NEW EMERGENCY PANEL WITH EXISTING BREAKER AND CONDUCTORS FROM PANEL M. CONTRACTOR TO INSPECT PANEL 'M' FOR CODE COMPLIANCE AND MAKE ANY REPAIRS REQUIRED.
4. INSTALL NEW PAD AND GENERATOR PER SCHEDULE. INSTALL NEW FENCE TO ENCLOSE AN AREA OF 15' X 8'. EXTEND GENERATOR EXHAUST TO ABOVE AWNING HEIGHT.
5. INSTALL NEW EMERGENCY LIGHT POSITIONED TO ILLUMINATE ATS. CONNECT TO UNSWITCHED LEG OF LIGHTING CIRCUIT IN ROOM.
6. INSTALL NEW EMERGENCY LIGHT POSITIONED TO ILLUMINATE GENERATOR. CONNECT TO EXISTING EXTERIOR LIGHTING CIRCUIT.



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ROBERT J. BLANCHETTE
120820
REGISTERED PROFESSIONAL ENGINEER

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EMC PROJECT #1710052

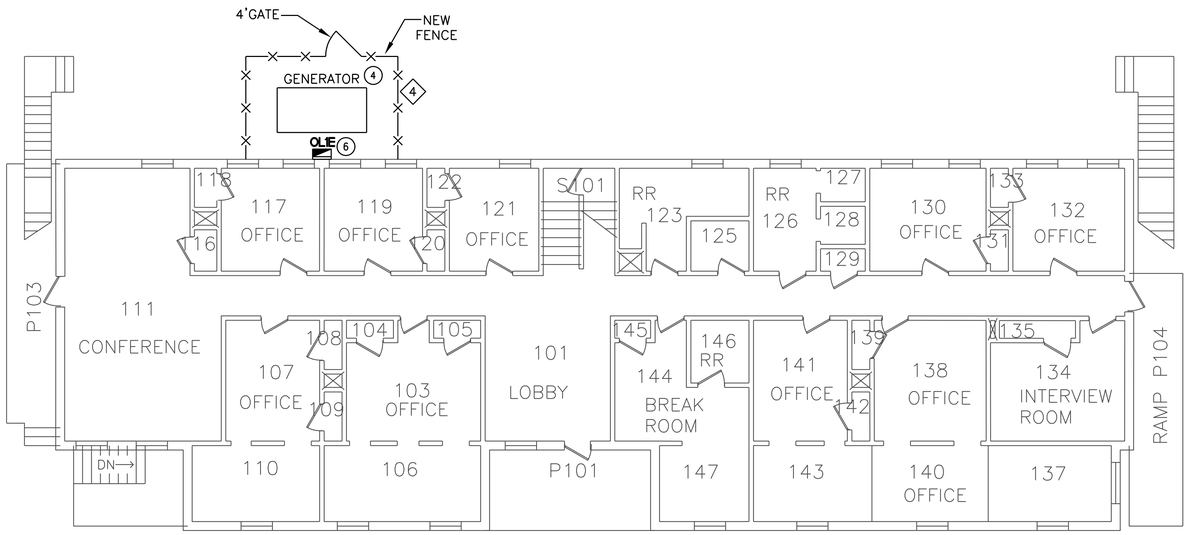
EMC ENGINEERS

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)

Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN

Sheet
E-401
BUILDING 514
GENERATOR REPLACEMENT
DEMOLITION AND
UPGRADE PLANS



ELECTRICAL - BUILDING 533 - FIRST FLOOR GENERATOR REPLACEMENT DEMOLITION AND UPGRADE PLANS

N PLAN 1 E-402

SCALE: 1/8" = 1'-0"

8 6 4 2 0 4 8 12 16

ELECTRICAL - BUILDING 533 - BASEMENT GENERATOR REPLACEMENT DEMOLITION AND UPGRADE PLANS

N PLAN 2 E-402

SCALE: 1/8" = 1'-0"

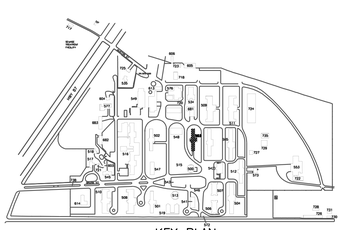
8 6 4 2 0 4 8 12 16

ELECTRICAL DEMOLITION KEYED NOTES:

1. REMOVE AUTOMATIC TRANSFER SWITCH. REMOVE CONDUCTORS AND CONDUIT TO EMERGENCY PANEL, MAIN PANEL, AND ATS MAIN BREAKER.
2. REMOVE EMERGENCY PANEL. PREPARE DISCONNECTED CIRCUITS TO BE RECONNECTED TO NEW PANEL.
3. REMOVE ATS MAIN BREAKER AND CONDUCTORS AND CONDUIT BACK TO GENERATOR.
4. REMOVE GENERATOR, FUEL TANK AND FENCE. RETAIN SIGN FOR REUSE. DEMOLISH EXISTING PAD.

ELECTRICAL REMODEL KEYED NOTES:

1. INSTALL NEW AUTOMATIC TRANSFER SWITCH PER SCHEDULE. ATS SHALL BE FROM SAME MANUFACTURER AS GENERATOR.
2. INSTALL NEW EMERGENCY PANEL PER RISER AND SCHEDULE
3. FEED NEW EMERGENCY PANEL WITH EXISTING BREAKER AND CONDUCTORS FROM PANEL M. CONTRACTOR TO INSPECT PANEL 'M' FOR CODE COMPLIANCE AND MAKE ANY REPAIRS REQUIRED.
4. INSTALL NEW PAD AND GENERATOR PER SCHEDULE. INSTALL NEW FENCE TO ENCLOSE AN AREA OF 15' X 8'. EXTEND GENERATOR EXHAUST TO ABOVE AWNING HEIGHT.
5. INSTALL NEW EMERGENCY LIGHT POSITIONED TO ILLUMINATE ATS. CONNECT TO UNSWITCHED LEG OF LIGHTING CIRCUIT IN ROOM.
6. INSTALL NEW EMERGENCY LIGHT POSITIONED TO ILLUMINATE GENERATOR. CONNECT TO EXISTING EXTERIOR LIGHTING CIRCUIT.



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EMC PROJECT #1710052

Rev.#	Date	Initials	Revision Description:

Designed By: EMC
Drawn By: EMC
Checked By: EMC
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Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)

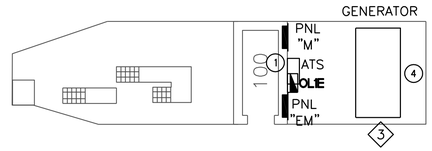
Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052

Date: 04/30/18

Scale: AS SHOWN

Sheet E-402
BUILDING 533 GENERATOR REPLACEMENT DEMOLITION AND UPGRADE PLANS

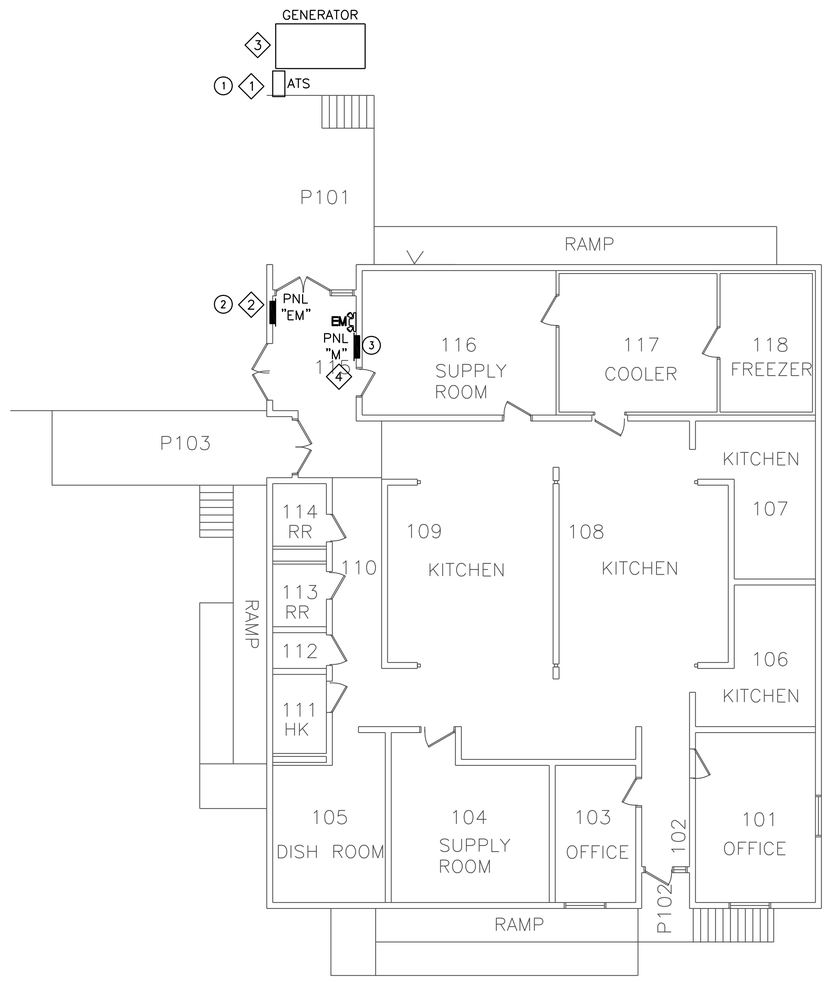


ELECTRICAL - BUILDING 607
GENERATOR REPLACEMENT DEMOLITION AND UPGRADE PLANS

N PLAN 1 E-403

SCALE: 1/8" = 1'-0"

8 6 4 2 0 4 8 12 16



ELECTRICAL - BUILDING 752
GENERATOR REPLACEMENT DEMOLITION AND UPGRADE PLANS

N PLAN 2 E-403

SCALE: 1/8" = 1'-0"

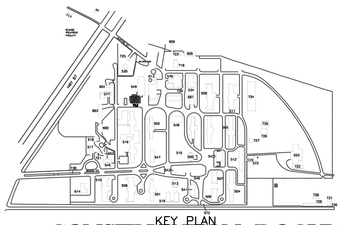
8 6 4 2 0 4 8 12 16

ELECTRICAL DEMOLITION KEYED NOTES: ◇#

1. REMOVE AUTOMATIC TRANSFER SWITCH. REMOVE CONDUCTORS AND CONDUIT TO EMERGENCY PANEL AND MAIN PANEL.
2. REMOVE EMERGENCY PANEL. PREPARE DISCONNECTED CIRCUITS TO BE RECONNECTED TO NEW PANEL.
3. REMOVE GENERATOR AND FUEL TANK. CUT OUT CONCRETE TO ACCEPT NEW PAD. REMOVE CONDUCTORS TO ATS.
4. REMOVE 3P BREAKER FEEDING EMERGENCY PANEL FROM PANEL M.

ELECTRICAL REMODEL KEYED NOTES: (#)

1. INSTALL NEW AUTOMATIC TRANSFER SWITCH PER SCHEDULE.
2. INSTALL NEW EMERGENCY PANEL PER RISER AND SCHEDULE. RECONNECT CIRCUITS FROM OLD EMERGENCY PANEL.
3. INSTALL NEW 200A 3P BREAKER IN PANEL M TO FEED PANEL EM.
4. INSTALL NEW PAD AND GENERATOR PER SCHEDULE. INSTALL NEW CONDUCTORS TO ATS PER SCHEDULE.



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120820
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EMC PROJECT #1710052

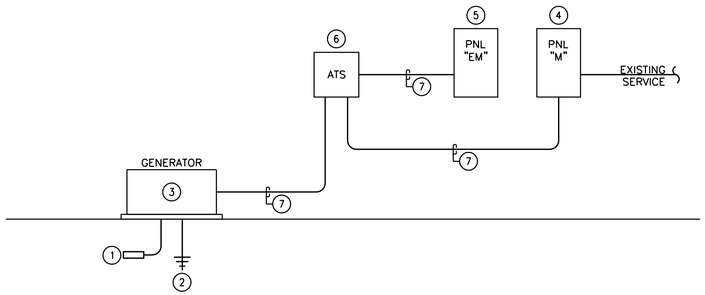
Designed By: EMC
Drawn By: EMC
Checked By: EMC
Scale: AS SHOWN

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)

Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN

Sheet E-403
BUILDINGS 607 AND 752 GENERATOR REPLACEMENT DEMOLITION AND UPGRADE PLANS



ELECTRICAL RISER DIAGRAM KEYED NOTES: (#)

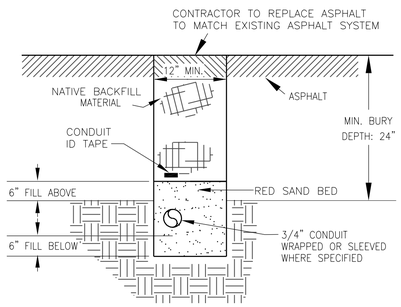
1. #4 CU TO CONCRETE ENCASED ELECTRODE
2. #6 CU GROUND TO 3/4" X 10' COPPER CLAD GROUND ROD
3. NEW GENERATOR PER SCHEDULE.
4. EXISTING PANEL. REPLACE BREAKER TO EMERGENCY PANEL IF NOTED ON GENERATOR REPLACEMENT PLANS
5. NEW OR EXISTING EMERGENCY PANEL AS NOTED ON GENERATOR. REPLACEMENT PLANS
6. NEW AUTOMATIC TRANSFER SWITCH PER SCHEDULE.
7. NEW OR EXISTING CONDUCTORS PER SCHEDULE.

GENERATOR SCHEDULE

BUILDING	MAKE	MODEL	CAPACITY	VOLTAGE	BREAKER	ATS	EMERGENCY PANEL	GEN TO ATS CONDUCTORS	MAIN PANEL TO ATS CONDUCTORS	ATS TO EM PANEL CONDUCTORS	ENCLOSURE	DIMENSIONS
503, 514, 533	CUMMINS	C40D6	40kW/50kVA	208/120	125A	150A	125A 30 SPACE	#1/0 THWN AND #6 GROUND	EXISTING	#1/0 THWN AND #6 GROUND	LEVEL 2	94" X 34" X 46"
607	CUMMINS	C80D6C	80kW/100kVA	480/277	125A	150A	EXISTING	#1/0 THWN AND #6 GROUND	EXISTING	EXISTING	WEATHER	98" X 40" X 58"
752	CUMMINS	C50D6C	50kW/63kVA	208/120	175A	200A	200A 42 SPACE	#3/0 THWN AND #6 GROUND	#3/0 THWN AND #6 GROUND	#3/0 THWN AND #6 GROUND	LEVEL1	119" X 40" X 58"

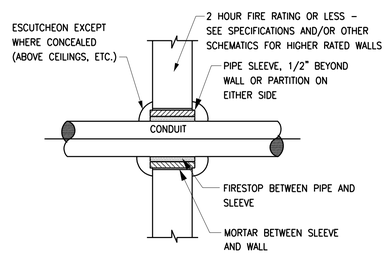
1 E-500 ELECTRICAL RISER DIAGRAM (TYPICAL)

NOT TO SCALE



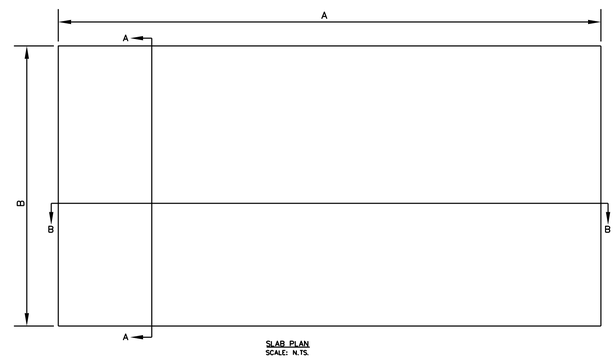
2 E-500 PIPING AND CONDUIT TRENCH SCHEMATIC

SCALE: NONE



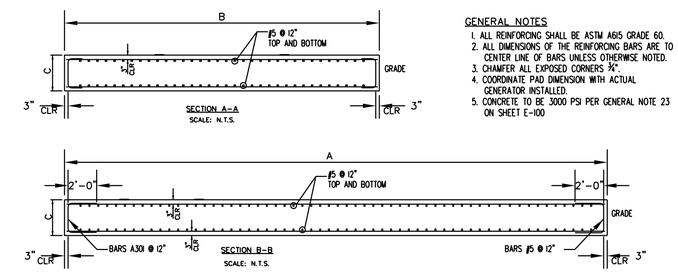
3 E-500 INTERIOR WALL CONDUIT PENETRATION

SCALE: NONE



GENERATOR PAD DIMENSIONS

BUILDING	DIMENSION A	DIMENSION B	DIMENSION C
503, 514, 533	13'	5'	1' 0"
607	10'	5'	1' 4"
752	13'	5'	1' 8"

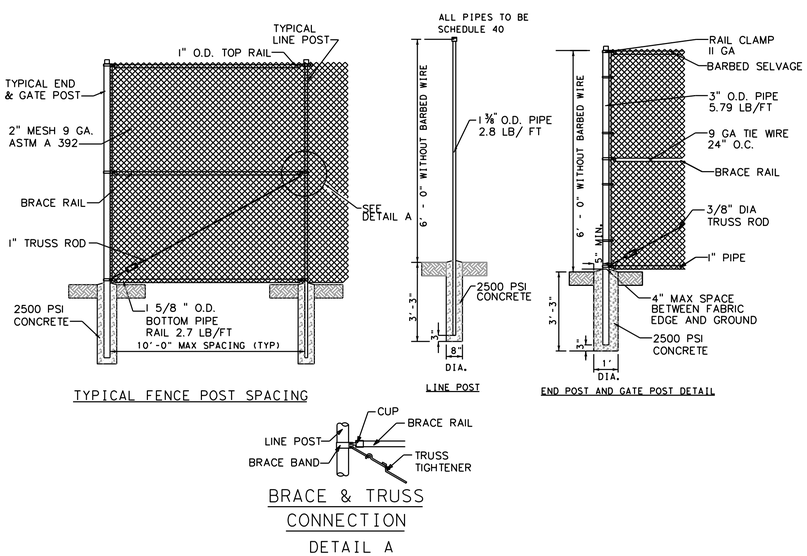


GENERAL NOTES

1. ALL REINFORCING SHALL BE ASTM A615 GRADE 60.
2. ALL DIMENSIONS OF THE REINFORCING BARS ARE TO CENTER LINE OF BARS UNLESS OTHERWISE NOTED.
3. CHAMFER ALL EXPOSED CORNERS ¾".
4. COORDINATE PAD DIMENSION WITH ACTUAL GENERATOR INSTALLED.
5. CONCRETE TO BE 3000 PSI PER GENERAL NOTE 23 ON SHEET E-100

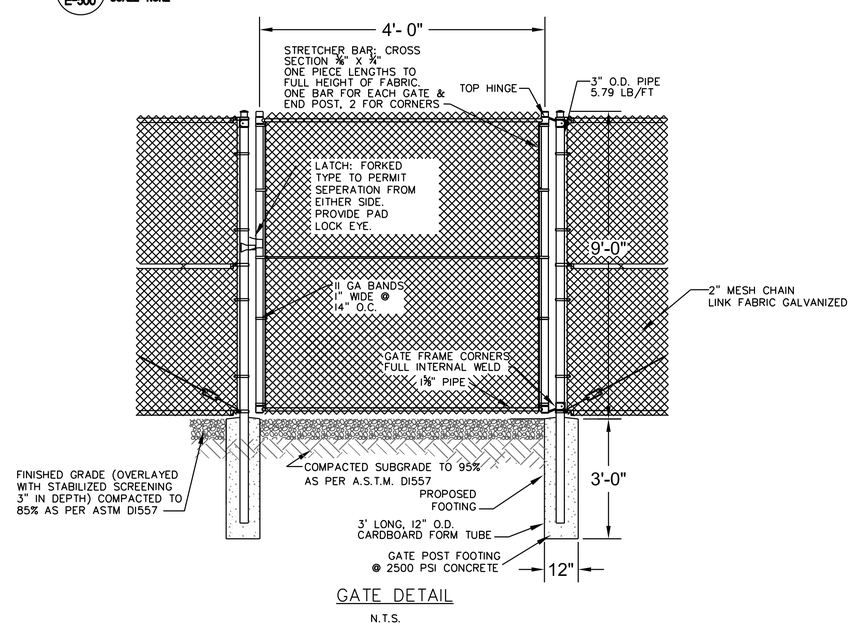
4 E-500 GENERATOR CONCRETE PAD DETAIL

SCALE: NONE



5 E-500 GENERATOR, TRANSFORMER AND ATS ENCLOSURE FENCE DETAIL

SCALE: NONE



6 E-500 GENERATOR, TRANSFORMER AND ATS GATE DETAIL

SCALE: NONE

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STATE OF TEXAS
ROBERT J. BLANCHETTE
120820
REGISTERED PROFESSIONAL ENGINEER

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CONSTRUCTION DOCUMENTS AUGUST 13, 2018

Rev.#	Date	Initials	Revision Description:

Designed By: EMC
Drawn By: EMC
Checked By: EMC
Scale: AS SHOWN

EMC ENGINEERS
2211 E. MISSOURI AVE. SUITE 312
EL PASO, TEXAS. 79903
PH: 915-781-2030
FAX: 915-781-2093
TEXAS FIRM REG. #F2491
EMC PROJECT #1710052

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)
Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN

Sheet E-500
ELECTRICAL RISER DIAGRAM, SCHEMATICS AND LIGHTING SCHEDULE PANELS
8 of: 9

PANEL "EL1" 503 SCHEDULE

TYPE: WYE — SERVICE: 208/120 VOLT — SIC: 14,000 AIC — 3 PHASE — 4 WIRE — MAIN: 125 AMPS — BUS: 150 AMPS — TYPE: MCB — MAIN BUS: COPPER
ENCLOSURE: NEMA 1 — TYPE: RECESSED MOUNTED — NEUTRAL BUS: COPPER — GROUNDING BUS: COPPER
LOCATION: BUILDING 503 HALL

WIRE / CONDUIT	CKT NO.	TYPE	SERVICE	POLE	AMP	VA	PH "A"	PH "B"	PH "C"	VA	AMP	POLE	SERVICE	TYPE	CKT NO.	WIRE / CONDUIT
	1	C	FIRST FLOOR EMERGENCY LIGHTS	1	20	1,000	2,000			1,000	20	1	SECOND FLOOR EMERGENCY LIGHTS	C	2	
	3	C	FIRST FLOOR EXIT LIGHTS	1	20	500		1,000		500	20	1	SECOND FLOOR EXIT LIGHTS	C	4	
	5								0						6	
	7	O	FIRE ALARM PANEL	1	20	400	900			500	20	1	IDF	O	8	
	9	O	GENERATOR	1	20	1,200		1,200			20	1	SPARE	O	10	
	11								0						12	
	13						0								14	
	15							0							16	
	17								0						18	
	19						0								20	
	21							0							22	
	23								0						24	
	25						0								26	
	27							0							28	
	29								0						30	

WIRING AND CONDUITS SHALL BE IN ACCORDANCE WITH E-100 ELECTRICAL GENERAL NOTES #36 AND #46, UNLESS NOTED OTHERWISE. DEMAND LOADS MAY VARY FROM CONNECTED LOADS BECAUSE OF CODE DIVERSITIES

	PH "A"	PH "B"	PH "C"	
CONNECTED VA	2,900	2,200	0	
CONNECTED AMPS	24.2	18.3	0.0	100.00% UNBALANCE %
TOTAL CONNECTED KVA	6.1	208.0	24.2	MAX. AMPS
DIVERSITY AMPS	28.3	20.4	0.0	
DIVERSITY VA	3,400	2,450	0	
TOTAL DIVERSITY KVA	6.9	208.0	28.3	DIVERSITY MAX. AMPS

TYPE OF LOAD:	DESCRIPTION	VA PH "A"	VA PH "B"	VA PH "C"	TOTAL VA	DEMAND FACTOR	DIVERSITY VA PH "A"	DIVERSITY VA PH "B"	DIVERSITY VA PH "C"	DIVERSITY VA	
C	CONTINUOUS	2,000	1,000	0	3,000	1.25	2,500	1,250	0	3,750	
N	NON-CONTINUOUS	0	0	0	0	1.00	0	0	0	0	
K	KITCHEN	0	0	0	0	0.65	0	0	0	0	
R	RECEPTACLES	0	0	0	0	1.00	0	0	0	0	NO DIVERSITY PER 2014 NEC TABLE 220.44 <= 10,000 VA
O	OTHER	900	1,200	0	2,100	1.00	900	1,200	0	2,100	
M	MECHANICAL	0	0	0	0	1.00	0	0	0	0	
	TOTAL KVA	2,900	2,200	0	5,100		3,400	2,450	0	5,850	

PANEL "EM" 514 SCHEDULE

TYPE: WYE — SERVICE: 208/120 VOLT — SIC: 14,000 AIC — 3 PHASE — 4 WIRE — MAIN: 125 AMPS — BUS: 150 AMPS — TYPE: MCB — MAIN BUS: COPPER
ENCLOSURE: NEMA 1 — TYPE: SURFACE MOUNTED — NEUTRAL BUS: COPPER — GROUNDING BUS: COPPER
LOCATION: BUILDING 514, B110

WIRE / CONDUIT	CKT NO.	TYPE	SERVICE	POLE	AMP	VA	PH "A"	PH "B"	PH "C"	VA	AMP	POLE	SERVICE	TYPE	CKT NO.	WIRE / CONDUIT
	1	C	1ST FLOOR EMERGENCY/EXIT LIGHTS	1	20	1,000	1,500			500	20	1	ELEVATOR PIT LIGHT AND RECEPTACLE	C	2	
	3	C	2ND FLOOR EMERGENCY/EXIT LIGHTS	1	20	1,000		1,200		200	20	1	BASEMENT LIGHT FOR PANEL	C	4	
	5	O	SPARE	1	20				0						6	
	7	O	FIRE ALARM PANEL	1	20	400	900			500	20	1	PHARMA REFRIGERATOR RECEPTACLE	O	8	
	9	O	GENERATOR	1	20	1,200		1,200			20	1	SPARE	O	10	
	11								0						12	
	13						0								14	
	15							0							16	
	17								0						18	
	19						0								20	
	21							0							22	
	23								0						24	
	25						0								26	
	27							0							28	
	29								0						30	

WIRING AND CONDUITS SHALL BE IN ACCORDANCE WITH E-100 ELECTRICAL GENERAL NOTES #36 AND #46, UNLESS NOTED OTHERWISE. DEMAND LOADS MAY VARY FROM CONNECTED LOADS BECAUSE OF CODE DIVERSITIES

	PH "A"	PH "B"	PH "C"	
CONNECTED VA	2,400	2,400	0	
CONNECTED AMPS	20.0	20.0	0.0	100.00% UNBALANCE %
TOTAL CONNECTED KVA	4.8	208.0	20.0	MAX. AMPS
DIVERSITY AMPS	23.1	22.5	0.0	
DIVERSITY VA	2,775	2,700	0	
TOTAL DIVERSITY KVA	5.5	208.0	23.1	DIVERSITY MAX. AMPS

TYPE OF LOAD:	DESCRIPTION	VA PH "A"	VA PH "B"	VA PH "C"	TOTAL VA	DEMAND FACTOR	DIVERSITY VA PH "A"	DIVERSITY VA PH "B"	DIVERSITY VA PH "C"	DIVERSITY VA	
C	CONTINUOUS	1,500	1,200	0	2,700	1.25	1,875	1,500	0	3,375	
N	NON-CONTINUOUS	0	0	0	0	1.00	0	0	0	0	
K	KITCHEN	0	0	0	0	0.65	0	0	0	0	
R	RECEPTACLES	0	0	0	0	1.00	0	0	0	0	NO DIVERSITY PER 2014 NEC TABLE 220.44 <= 10,000 VA
O	OTHER	900	1,200	0	2,100	1.00	900	1,200	0	2,100	
M	MECHANICAL	0	0	0	0	1.00	0	0	0	0	
	TOTAL KVA	2,400	2,400	0	4,800		2,775	2,700	0	5,475	

PANEL "EM" 533 SCHEDULE

TYPE: WYE — SERVICE: 208/120 VOLT — SIC: 14,000 AIC — 3 PHASE — 4 WIRE — MAIN: 125 AMPS — BUS: 150 AMPS — TYPE: MCB — MAIN BUS: COPPER
ENCLOSURE: NEMA 1 — TYPE: SURFACE MOUNTED — NEUTRAL BUS: COPPER — GROUNDING BUS: COPPER
LOCATION: BUILDING 533, B102

WIRE / CONDUIT	CKT NO.	TYPE	SERVICE	POLE	AMP	VA	PH "A"	PH "B"	PH "C"	VA	AMP	POLE	SERVICE	TYPE	CKT NO.	WIRE / CONDUIT
	1	C	EM LTS, KITCHEN, HALL CNTRL ROOM	1	20	1,000	2,000			1,000	20	1	EM LTS, DINING & DISH ROOMS	C	2	
	3	O	FIRE ALARM	1	20	400		1,400		1,000	20	1	GENERATOR	O	4	
	5	C	EXIT LIGHTS, RECEPTACLE IN KITCHEN	1	20	600			1,600	1,000	20	1	EM LTS, OFFICE, RESTROOMS, SERVING	C	6	
	7						0								8	
	9							0							10	
	11								0						12	
	13						0								14	
	15							0							16	
	17								0						18	
	19						0								20	
	21							0							22	
	23								0						24	
	25						0								26	
	27							0							28	
	29								0						30	

WIRING AND CONDUITS SHALL BE IN ACCORDANCE WITH E-100 ELECTRICAL GENERAL NOTES #36 AND #46, UNLESS NOTED OTHERWISE. DEMAND LOADS MAY VARY FROM CONNECTED LOADS BECAUSE OF CODE DIVERSITIES

	PH "A"	PH "B"	PH "C"	
CONNECTED VA	2,000	1,400	1,600	
CONNECTED AMPS	16.7	11.7	13.3	30.00% UNBALANCE %
TOTAL CONNECTED KVA	5.0	208.0	16.7	MAX. AMPS
DIVERSITY AMPS	20.8	11.7	16.7	
DIVERSITY VA	2,500	1,400	2,000	
TOTAL DIVERSITY KVA	5.9	208.0	20.8	DIVERSITY MAX. AMPS

TYPE OF LOAD:	DESCRIPTION	VA PH "A"	VA PH "B"	VA PH "C"	TOTAL VA	DEMAND FACTOR	DIVERSITY VA PH "A"	DIVERSITY VA PH "B"	DIVERSITY VA PH "C"	DIVERSITY VA	
C	CONTINUOUS	2,000	0	1,600	3,600	1.25	2,500	0	2,000	4,500	
N	NON-CONTINUOUS	0	0	0	0	1.00	0	0	0	0	
K	KITCHEN	0	0	0	0	0.65	0	0	0	0	
R	RECEPTACLES	0	0	0	0	1.00	0	0	0	0	NO DIVERSITY PER 2014 NEC TABLE 220.44 <= 10,000 VA
O	OTHER	0	1,400	0	1,400	1.00	0	1,400	0	1,400	
M	MECHANICAL	0	0	0	0	1.00	0	0	0	0	
	TOTAL KVA	2,000	1,400	1,600	5,000		2,500	1,400	2,000	5,900	

PANEL "EM" 752 SCHEDULE

TYPE: WYE — SERVICE: 208/120 VOLT — SIC: 14,000 AIC — 3 PHASE — 4 WIRE — MAIN: 175 AMPS — BUS: 200 AMPS — TYPE: MCB — MAIN BUS: COPPER
ENCLOSURE: NEMA 1 — TYPE: SURFACE MOUNTED — NEUTRAL BUS: COPPER — GROUNDING BUS: COPPER
LOCATION: BUILDING 533, B102

WIRE / CONDUIT	CKT NO.	TYPE	SERVICE	POLE	AMP	VA	PH "A"	PH "B"	PH "C"	VA	AMP	POLE	SERVICE	TYPE	CKT NO.	WIRE / CONDUIT
	1	K	COOLER	2	60	5,500	6,100			600	20	1	WALK IN FANS	K	2	
	3	K				5,500		6,600		1,000	20	1	EXISTING CIRCUIT	O	4	
	5	K	FREEZER VAULT FANS	2	20	1,000			2,000	1,000	20	1	EXISTING CIRCUIT	O	6	
	7	K				1,000	1,000				20	1	SPARE	O	8	
	9	K	FREEZER VAULT	2	60	5,000		6,000		1,000	20	1	EXISTING CIRCUIT	O	10	
	11	K				5,000			6,000	1,000	20	1	EXISTING CIRCUIT	O	12	
	13	K	ICE MACHINE	2	20	1,200	2,200			1,000	20	1	EXISTING CIRCUIT	O	14	
	15	K				1,200		1,600		400	20	1	FIRE ALARM PANEL	O	16	
	17	O	EXISTING CIRCUIT	1	20	900			1,900	1,000	20	1	EXISTING CIRCUIT	O	18	
	19	O	EXISTING CIRCUIT	1	20	900	1,400			500	20	1	DOOR	O	20	
	21	O	EXISTING CIRCUIT	1	20	900		900			20	1	SPARE	O	22	
	23								0						24	
	25						0								26	
	27							0							28	
	29								0						30	
	31						0								32	
	33							0							34	
	35								0						36	
	37						0								38	
	39							0							40	
	41								0						42	

WIRING AND CONDUITS SHALL BE IN ACCORDANCE WITH E-100 ELECTRICAL GENERAL NOTES #36 AND #46, UNLESS NOTED OTHERWISE. DEMAND LOADS MAY VARY FROM CONNECTED LOADS BECAUSE OF CODE DIVERSITIES

	PH "A"	PH "B"	PH "C"	
CONNECTED VA	10,700	15,000	9,900	
CONNECTED AMPS	89.2	125.0	82.5	34.00% UNBALANCE %
TOTAL CONNECTED KVA	35.6	208.0	125.0	MAX. AMPS
DIVERSITY AMPS	65.0	90.9	65.0	
DIVERSITY VA	7,795	10,905	7,800	
TOTAL DIVERSITY KVA	26.5	208.0	90.9	DIVERSITY MAX. AMPS

TYPE OF LOAD:	DESCRIPTION	VA PH "A"	VA PH "B"	VA PH "C"	TOTAL VA	DEMAND FACTOR	DIVERSITY VA PH "A"	DIVERSITY VA PH "B"	DIVERSITY VA PH "C"	DIVERSITY VA	
C	CONTINUOUS	0	0	0	0	1.25	0	0	0	0	
N	NON-CONTINUOUS	0	0	0	0	1.00	0	0	0	0	
K	KITCHEN	8,300	11,700	6,000	26,000	0.65	5,395	7,605	3,900	16,900	
R	RECEPTACLES	0	0	0	0	1.00	0	0	0	0	NO DIVERSITY PER 2014 NEC TABLE 220.44 <= 10,000 VA
O	OTHER	2,400	3,300	3,900	9,600	1.00	2,400	3,300	3,900	9,600	
M	MECHANICAL	0	0	0	0	1.00	0	0	0	0	
	TOTAL KVA	10,700	15,000	9,900	35,600		7,795	10,905	7,800	26,500	

EXISTING PANEL "P" SCHEDULE

TYPE: WYE — SERVICE: 208/120 VOLT — SIC: 14,000 AIC — 3 PHASE — 4 WIRE — MAIN: 100 AMPS — BUS: 100 AMPS — TYPE: MCB — MAIN BUS: COPPER
ENCLOSURE: NEMA 1 — TYPE: SURFACE MOUNTED — NEUTRAL BUS: COPPER — GROUNDING BUS: COPPER
LOCATION: BOILER ROOM

WIRE / CONDUIT	CKT NO.	TYPE	SERVICE	POLE	AMP	VA	PH "A"	PH "B"	PH "C"	VA	AMP	POLE	SERVICE	TYPE	CKT NO.	WIRE / CONDUIT
	1	M	BOILER B-1 (NEW)	2	20	2,000	3,000			1,000	20	2	CIRCULATION PUMP B-1 (NEW)	M	2	
	3	M				2,000		3,000		1,000				M	4	
	5	M	BOILER B-2 (NEW)	2	20	2,000			3,000	1,000	20	2	CIRCULATION PUMP B-2 (NEW)	M	6	
	7	M				2,000	3,000			1,000				M	8	
	9	M	BOILER B-3 (NEW)	2	20	2,000		2,300		300	20	1	CHIMNEY SPOTLIGHTS VIA TIMER (NEW)	C	10	
	11	M				2,000			3,000	1,000	20	2	CIRCULATION PUMP B-3 (NEW)	M	12	
	13						1,000			1,000				M	14	
	15	M	BOILER B-4 (NEW)	2	20	2,000		2,000			20	1	EXISTING BREAKER	O	16	
	17	M				2,000			2,000		20	1	EXISTING BREAKER	O	18	
	19						1,000			1,000	20	2	CIRCULATION PUMP B-4 (NEW)	M	20	
	21							1,000		1,000				M	22	
	23								0		20	1	EXISTING BREAKER	O	24	
	25						0				20	1	EXISTING BREAKER	O	26	
	27							0			20	1	EXISTING BREAKER	O	28	
	29								0		20	1	EXISTING BREAKER	O	30	
	31						0				20	1	EXISTING BREAKER	O	32	
	33							0			20	1	EXISTING BREAKER	O	34	
	35								0		20	1	EXISTING BREAKER	O	36	

WIRING AND CONDUITS SHALL BE IN ACCORDANCE WITH E-100 ELECTRICAL GENERAL NOTES #36 AND #46, UNLESS NOTED OTHERWISE. DEMAND LOADS MAY VARY FROM CONNECTED LOADS BECAUSE OF CODE DIVERSITIES

	PH "A"	PH "B"	PH "C"	
CONNECTED VA	8,000	8,300	8,000	
CONNECTED AMPS	66.7	69.2	66.7	3.61% UNBALANCE %
TOTAL CONNECTED KVA	24.3	208.0	69.2	MAX. AMPS
DIVERSITY AMPS	66.7	69.8	66.7	
DIVERSITY VA	8,000	8,375	8,000	
TOTAL DIVERSITY KVA	24.4	208.0	69.8	DIVERSITY MAX. AMPS

TYPE OF LOAD:	DESCRIPTION	VA PH "A"	VA PH "B"	VA PH "C"	TOTAL VA	DEMAND FACTOR	DIVERSITY VA PH "A"	DIVERSITY VA PH "B"	DIVERSITY VA PH "C"	DIVERSITY VA	
C	CONTINUOUS	0	300	0	300	1.25	0	375	0	375	
N	NON-CONTINUOUS	0	0	0	0	1.00	0	0	0	0	
K	KITCHEN	0	0	0	0	0.65	0	0	0	0	
R	RECEPTACLES	0	0	0	0	1.00	0	0	0	0	NO DIVERSITY PER 2014 NEC TABLE 220.44 <= 10,000 VA
O	OTHER	0	0	0	0	1.00	0	0	0	0	
M	MECHANICAL	8,000	8,000	8,000	24,000	1.00	8,000	8,000	8,000	24,000	
	TOTAL KVA	8,000	8,300	8,000	24,300		8,000	8,375	8,000	24,375	

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CONSTRUCTION DOCUMENTS AUGUST 13, 2018

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Drawn By: EMC
Checked By: EMC
Scale: AS SHOWN

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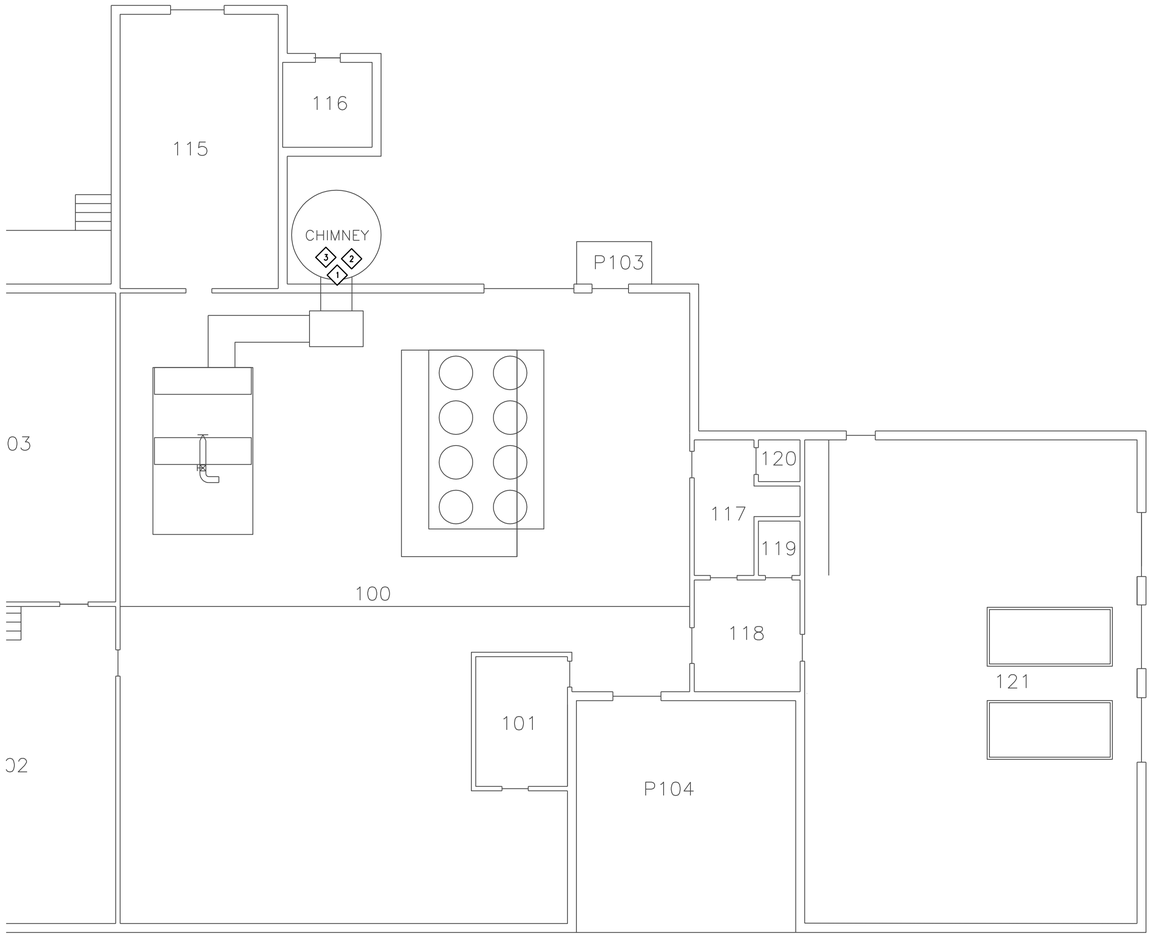
TEXAS FIRM REG. #F2491
EMC PROJECT #1710052

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)
Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN
Sheet E-600
ELECTRICAL PANEL SCHEDULES

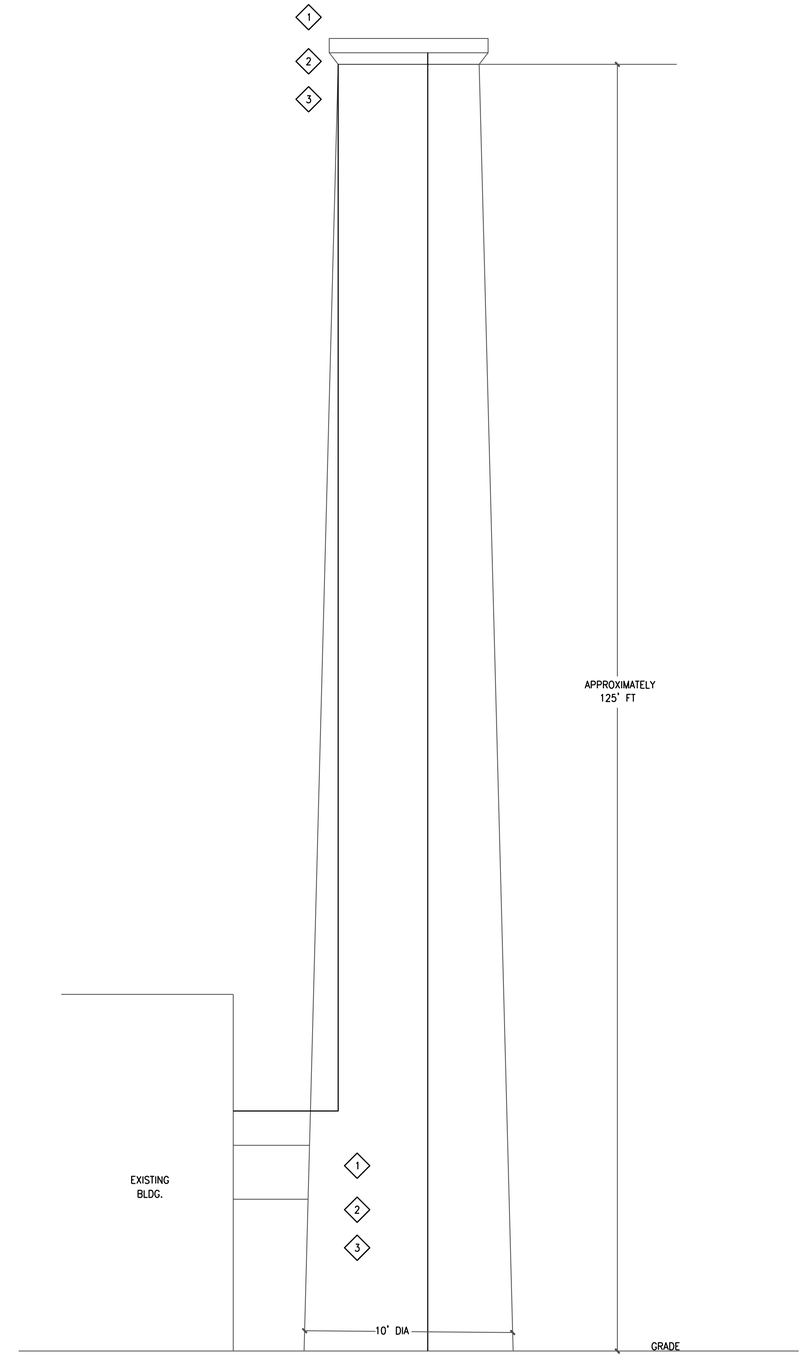


1 CH-100 CHIMNEY - BUILDING 550 SURFACE UPGRADE FLOOR PLAN

N PLAN

SCALE: 1/8" = 1'-0"

8 6 4 2 0 4 8 12 16



2 CH-100 CHIMNEY - SURFACING UPGRADE ELEVATION

SCALE: NONE

CHIMNEY REFURBISHMENT AND UPGRADE KEYED NOTES:

1. EXISTING CHIMNEY IS TO BE CLEANED AND REFURBISHED PER SPECIFICATIONS. COORDINATE REMOVAL AND REINSTALLATION OF ELECTRICAL LIGHTING AND LIGHTNING PROTECTION WITH THE ELECTRICAL CONTRACTOR.
2. EXISTING CHIMNEY IS TO BE PRIME PAINTED WITH MASONRY COATING PER THE SPECIFICATIONS.
3. EXISTING CHIMNEY IS TO BE PAINTED WITH FINAL EXTERIOR COATING PER THE SPECIFICATIONS.

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EMC ENGINEERS
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TEXAS FIRM REG. #F2491
EMC PROJECT #1710052

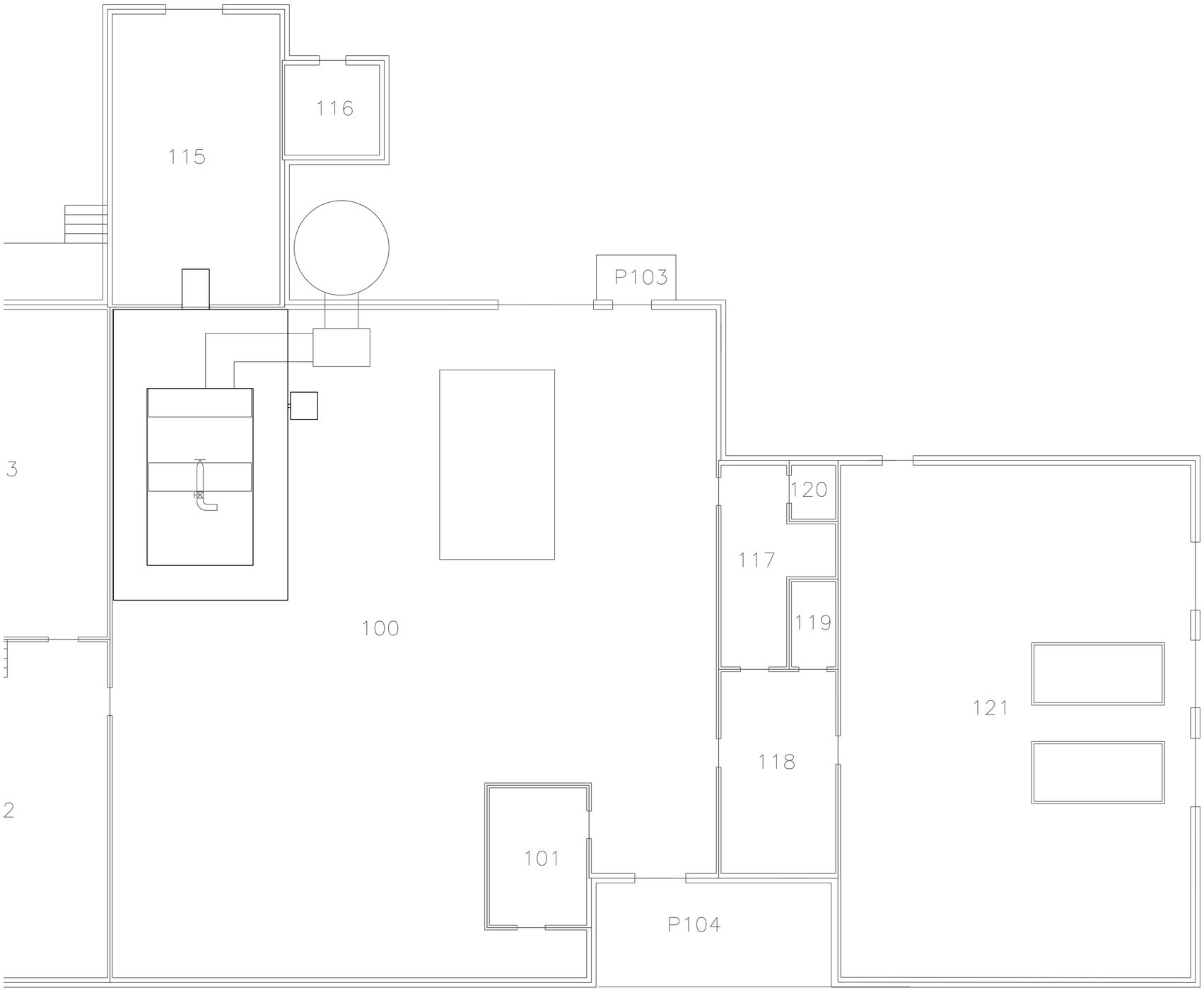
Rev.#	Date	Initials	Revision Description:

Designed By: EMC
Drawn By: EMC
Checked By: EMC
Scale: AS SHOWN

Project: EMERGENCY GENERATOR AND MECHANICAL SYSTEMS UPGRADE
PROJECT NO : 18-131-SGL (1)
Location: SAN ANGELO STATE SUPPORTED LIVING CENTER
11640 US HIGHWAY 87 N, CARLSBAD, TEXAS 76934

Job Number: 1710052
Date: 04/30/18
Scale: AS SHOWN

Sheet
CH-100
DEMOLITION AND UPGRADE
BUILDING 550 CHIMNEY
1 of: 1



ASBESTOS ABATEMENT KEYED NOTES:

DECONTAMINATION UNIT TO COMPLETELY ENCLOSE THE EXISTING BOILER PER THE REQUIREMENTS OF THE SPECIFICATIONS AND NOTES 2 AND 3.

CONTRACTOR TO ERECT 6 MIL. POLY WALL AFFIXED TO RIGID FRAMING OF WOOD ON 24" CENTERS. THE WALL SHALL EXTEND FROM THE FLOOR TO THE CEILING/ROOF TO FULLY ENCLOSE THE STEAM BOILER.

CONTRACTOR TO INSTALL FULLY FUNCTIONAL DECONTAMINATION UNIT AND SUFFICIENT NEGATIVE AIR MACHINES TO ESTABLISH AND MAINTAIN −02" WC

NEGATIVE AIR MACHINES EXHAUST DUCT TO EXHAUST OUTSIDE OF BUILDING. AS MANY UNITS AS NEEDED TO ESTABLISH −02"WC. COORDINATE ELECTRICAL POWER WITH THE ELECTRICAL CONTRACTOR. COORDINATE EXHAUST RUNS WITH EXISTING BUILDING OPENINGS.

WASTE LOAD OUT DECONTAMINATION UNIT, COORDINATE AN APPROVED ROUTE OUT FROM WASTE LOAD OUT TO DISPOSAL TO APPROVED DISPOSAL VEHICLE WITH THE ENGINEER AND OWNER

KNOWN PIPING WITH ASBESTOS INSULATION APPROXIMATELY FIFTEEN (15) FEET OF INSULATION. ASBESTOS CONTRACTOR TO REMOVE ASBESTOS WHILE THE BOILER IS BEING ABATED.

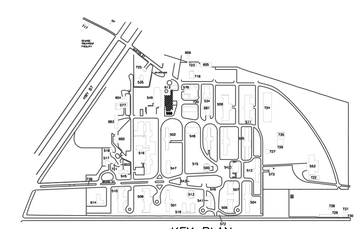
N PLAN

1 / AB-100

ASBESTOS BUILDING 550 ABATEMENT PLAN

SCALE: 3/16" = 1'-0"

4 3 2 1 0 4 8 12



KEY PLAN

STATE OF TEXAS
MELVIN GARY GLASS
64955
LICENSED
PROFESSIONAL ENGINEER

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